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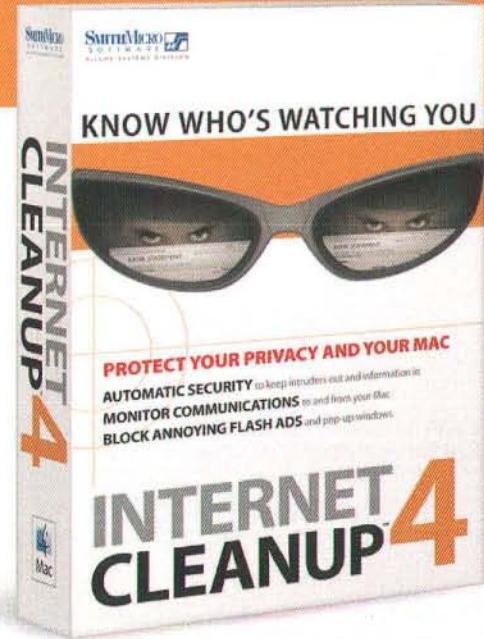
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# *From the Editor*

Welcome to October MacTech! While this is my first "From the Editor," I want to keep it short and sweet. It's absolutely a pleasure to be working more closely with everyone at the magazine. Particularly the authors! There are some incredible people writing, and more that are submitting proposals for consideration.

Equally important are the faithful readers! Thank you for years of renewals, and thank you for writing in yourselves. If you have ideas, questions or comments, please do not hesitate to write in! This is how we tune the magazine to your needs. You can send your comments to [letters@mactech.com](mailto:letters@mactech.com).

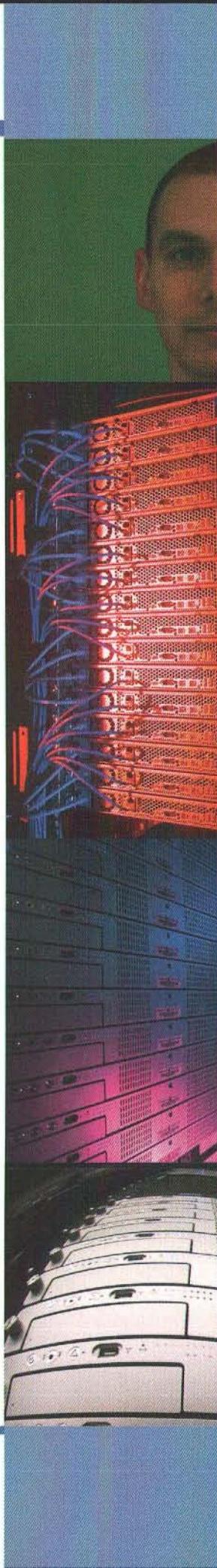
This month showcases articles that will impact your everyday routine. OS X Server presents a compelling system for any small business. It's easy to get a website up and running using the tools supplied. However, when the business grows, and the website expands, you may notice that the site isn't quite as snappy as it used to be. Frequent contributors Emmanuel Stein, Jin Lin, and Jamie Ferri show us how to tune your web server for performance.

You may have heard of the Mac OS X Enterprise Project ([macenterprise.org](http://macenterprise.org))? Co-chair Philip Rinehart follows up his excellent Automator article with a piece on CUPS – the printing system in OS X. We've gotten many requests for more information on CUPS, and Philip's article is sure to satisfy!

It's your dream: you're charged with transitioning a department or company from Windows to an all-Mac environment. However, there are roadblocks. Paul Ammann is also back with a topic that most of us encounter at one point or another: transferring mail from Outlook to Entourage.

Of course, we have our other regular features to keep you up-to-date and in-the-know. One even covers both the Rails and AJAX phenomenon! Enjoy, and remember to write in!

*- Edward Marczak, Executive Editor*



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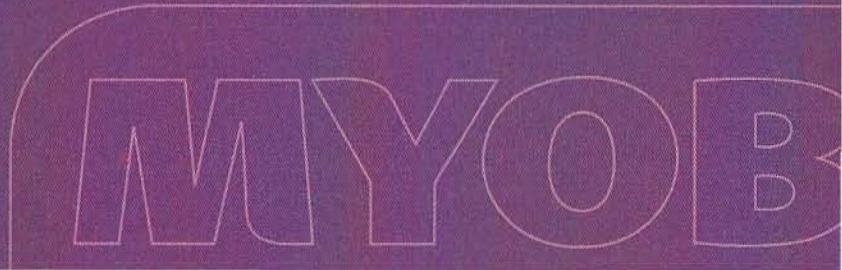
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# APPLESCRIPT ESSENTIALS

by Benjamin S. Waldie

## Introduction to Scripting QuarkXPress

My last two columns have focused on using AppleScript to automate graphic processing with Photoshop and GraphicConverter. This month, we are going to switch gears from graphic processing to discuss another commonly automated creative process – desktop publishing. Specifically, we will explore some initial steps necessary for automating a desktop publishing workflow using QuarkXPress, a popular page layout application.

### History

QuarkXPress was one of the first applications to support AppleScript, with version 3.2. In fact, it is believed by some that QuarkXPress is actually partially responsible for AppleScript being around today. Rumor has it that, at one time, Apple had planned to do away with AppleScript, but received such a backlash from the publishing community, who threatened to move to PCs if their scripted workflows were taken away, that it was decided to keep AppleScript around.



Figure 1. QuarkXPress 7's New Icon

One great aspect of Quark's AppleScript support is its commitment to backward-compatibility. From the early days to today with version 7, see figure 1, Quark's AppleScript support has not changed all that much. New terminology has been added for new application features. However, existing terminology has stayed relatively the same, with only minor modifications along the way. This has allowed many users to upgrade their scripts for new versions of Quark without the hassle of making a large

number of adjustments. In fact, the recent jump from Quark 6 – 7 introduced only a handful of changes to existing AppleScript terminology, allowing many Quark 6 scripts to function in Quark 7 without any changes whatsoever.

### Getting Started

As you begin scripting Quark, be sure to refer to Quark's AppleScript dictionary regularly to determine the proper terminology to use. (See figure 2.) You will find that Quark's dictionary is broken into a number of logical suites of classes and commands, and that Quark's containment hierarchy is fairly straightforward.

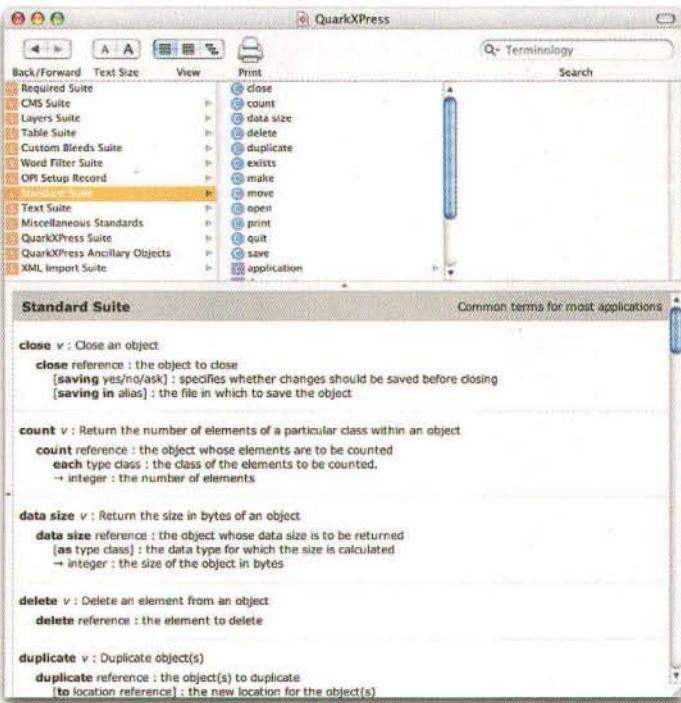


Figure 2. QuarkXPress' AppleScript Dictionary

For Quark 6.x users, I highly recommend downloading and installing an updated copy of the *Script.xnt* XTension. This updated XTension will fix problems that may occur when printing Quark documents to PostScript format in Mac OS X 10.4 and higher. This XTension is part of a package named *Output Enhancements XTensions software (user mode) for QuarkXPress and QuarkXPress Passport 6.5*. This package is available for download from the *Support > Desktop Downloads* section of Quark's website at <http://www.quark.com/service/desktop/downloads/details.jsp?idx=601>.

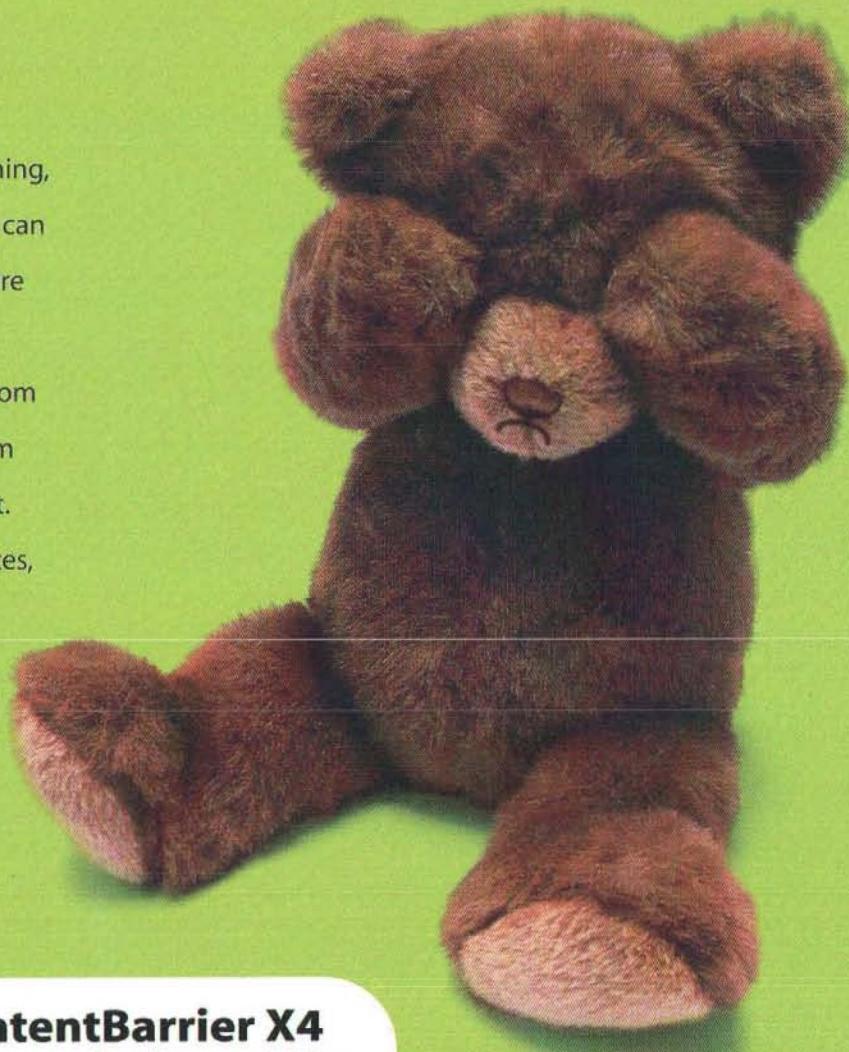
### Getting to Know Quark Projects

In QuarkXPress, the document in which you will work is known as a project, and a project contains one or more layout spaces. For example, a project could contain a print layout, a web layout, and more. Prior to Quark 6, layout spaces did not

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exist, nor did projects. At that time, a document was simply called a *document*.

As far as AppleScript is concerned, Quark's AppleScript terminology contains project, layout space, and document classes. The document class exists to allow for compatibility with scripts written for older versions of Quark.

When referring to a project in Quark, you do so as follows:

```
tell application "QuarkXPress"
    tell project 1
        - Do something
    end tell
end tell
```

The code above would refer to the frontmost project. The following code demonstrates how you would address a layout space within that project. In this case, the first layout space is being addressed. Even if the project only has one layout space, you must still address the layout.

```
tell application "QuarkXPress"
    tell layout space 1 of project 1
        - Do something
    end tell
end tell
```

As mentioned before, Quark also supports a class of document, which you may use if you choose to. For example:

```
tell application "QuarkXPress"
    tell document 1
        - Do something
    end tell
end tell
```

Referring to a document in this manner is essentially the same as referring to the current layout space of a project. In this example, document 1 refers to the frontmost project document.

In the examples above, I referred to projects, layout spaces, and documents by their index, or front to back ordering. Of course, you may also refer to projects, layout spaces, and documents by their names, if desired. For example:

```
tell application "QuarkXPress"
    tell layout space "Layout 1" of project "Project1"
        - Do something
    end tell
end tell
```

## Creating a Project

To create a new project with a single layout space in QuarkXPress, use the make command, the result of which will be a reference to the newly created project. For example:

```
tell application "QuarkXPress"
    make new project at beginning
end tell
→ project "Project1" of application "QuarkXPress"
```

In Quark, layout spaces within the same project can be different sizes. In the code above, we did not specify a height and width for the layout space in the newly created project. Because of this, Quark's current default size settings will be used to create the project. However, these can be adjusted by modifying the page height and page width properties of

the default document class, prior to creating the project. For example, the following code would create a project containing a layout space that is 6 inches high and 8 inches wide.

```
tell application "QuarkXPress"
    tell default document 1
        set page height to "6 in"
        set page width to "8 in"
    end tell
    make new project at beginning
end tell
→ project "Project1" of application "QuarkXPress"
```

The layout space class itself also has page height and page width properties, which can be modified after the project is created, if desired. For example, the following code would create a new project with a single layout space that is 4 inches high by 4 inches wide.

```
tell application "QuarkXPress"
    set theProject to make new project at beginning
    tell layout space 1 of theProject
        set page height to "4 in"
        set page width to "4 in"
    end tell
end tell
```

## Creating a New Layout Space

The make command may also be used to create a new layout space within an existing project. In doing so, you may choose to specify properties of the layout space, such as page height and page width. For example:

```
tell application "QuarkXPress"
    tell project 1
        make new layout space at end with properties {page
height:"11 in", page width:"8.5 in"}
    end tell
end tell
```

## Working with Text

### Creating a Text Box

A key aspect of scripting Quark involves working with text. In Quark, text is placed into text boxes on pages within layout spaces. To create a text box via AppleScript, you will need to determine where you would like the text box to be created, and how large you would like it to be.

First, determine the page on which the text box should be created. Next, determine where you would like the box to be positioned on that page, and how large it should be. This information will be communicated to Quark using a list of bounds. This list will be formatted as follows:

```
{top position, left position, bottom position, right
position}
```

Now, to create the text box, use the make command, and specify the bounds for the box as follows:

```
tell application "QuarkXPress"
    tell page 1 of layout space 1 of project 1
        make new text box at beginning with properties
{bounds:{1 in, 1 in, 3 in, 6 in}}
    end tell
end tell
→ text box 1 of page 1 of layout space "Layout 1" of
project "Project1" of application "QuarkXPress"
```

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Using the code above, a text box would be created on page 1 of the layout space. The top left corner of the box would be one inch down, and one inch from the left side of the page. The bottom right corner of the box would be 3 inches down, and 6 inches from the left side of the page. Therefore, this text box would be 2 inches high and 5 inches across.

## Placing Text

In Quark, a story represents all of the text within a text box. Once a text box exists, you may set its text to a specified string by setting the value of its *story* element. For example:

```
tell application "QuarkXPress"
tell page 1 of layout space 1 of project 1
    set story 1 of text box 1 to "My Project Text"
end tell
end tell
```

Please note that the code above would replace existing text in the box, if present.

## Styling Text

Stories possess numerous text properties, which are modifiable via AppleScript. I will cover only a few of these in this column. I encourage you to explore Quark's AppleScript dictionary for a complete list of these properties. Please note that many of these are found under the *text properties* and *character properties* classes, which are inherited by the *story* class.

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The following example code demonstrates the modification of a number of different character properties within a story, including font, size, and color. As you can see, values for these properties may be applied to the story itself, such as in the case of the *font* property below. Or, values may be applied to elements of the story, such as specific paragraphs, words, or characters.

```
tell application "QuarkXPress"
tell page 1 of layout space 1 of project 1
    tell story 1 of text box 1
        set font to "Arial"
        set size of word 2 to 24
        set color of word 1 to "Yellow"
        set color of word 2 to "Cyan"
        set color of word 3 to "Magenta"
    end tell
end tell
end tell
```

Figure 3 shows an example of a text box containing text that was styled using the example code above.

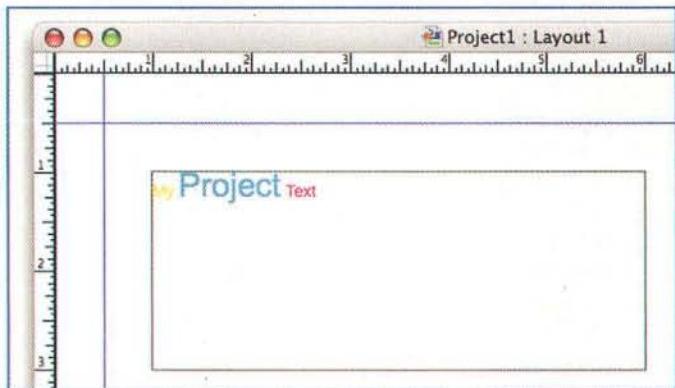


Figure 3. Styled Text in QuarkXPress

## Working with Pictures

### Creating a Picture Box

As you will find, working with picture boxes in Quark is very similar to working with text boxes. To create a picture box, use the *make* command, and specify a value for the box's *bounds* property. Again, the bounds of the box will indicate its size and positioning on the specified page. The following example code will create a 3 inch high by 5 inch wide picture box.

```
tell application "QuarkXPress"
tell page 1 of layout space 1 of project 1
    make new picture box at beginning with properties
    {bounds:"[3 in", "1 in", "6 in", "6 in"]}
end tell
end tell
→ picture box 1 of page 1 of layout space "Layout 1" of
project "Project1" of application "QuarkXPress"
```

### Placing a Picture

Once you have created a picture box, you will probably want to place a picture within it. To do this, set its *image* to a specified file path. For example:

```
set theImage to choose file with prompt "Please select an
image to place:" without invisibles
```

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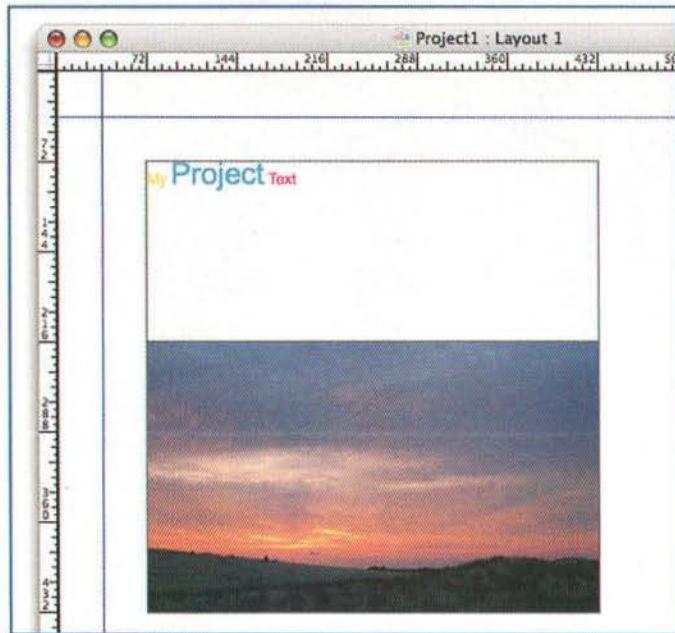
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```

tell application "QuarkXPress"
    tell page 1 of layout space 1 of project 1
        tell picture box 1
            set image 1 to theImage
        end tell
    end tell
end tell

```

Figure 4 demonstrates a picture box in Quark that has been populated with an image file using the example code above.



**Figure 4. A Placed Picture**

## Naming Boxes

In most of the examples so far, we have referred to text and picture boxes by their index, i.e. front to back ordering on the page. The problem with writing a script in this manner is that the ordering of the boxes on a page may change if boxes are added, grouped, or deleted.

To get around this limitation, and ensure that your script is always interacting with the correct boxes, it is good practice to assign names to boxes in your Quark documents. Just as projects, layout spaces, and documents can be referred to by name, text and picture boxes can also be referred to by name. The problem, however, is that Quark does not provide an interface for naming text and picture boxes. Therefore, this must be done using AppleScript, by modifying the name property of the desired box. For example:

```

tell application "QuarkXPress"
    tell page 1 of layout space 1 of project 1
        tell text box 1
            set name to "Photo Description"
        end tell
    end tell
end tell

```

Once a name has been assigned to a box, you can use its name, rather than its index, to refer to the box. For example:

```

tell application "QuarkXPress"
    tell page 1 of layout space 1 of project 1
        set text of text box "Photo Description" to "Photo
Description"
    end tell
end tell

```



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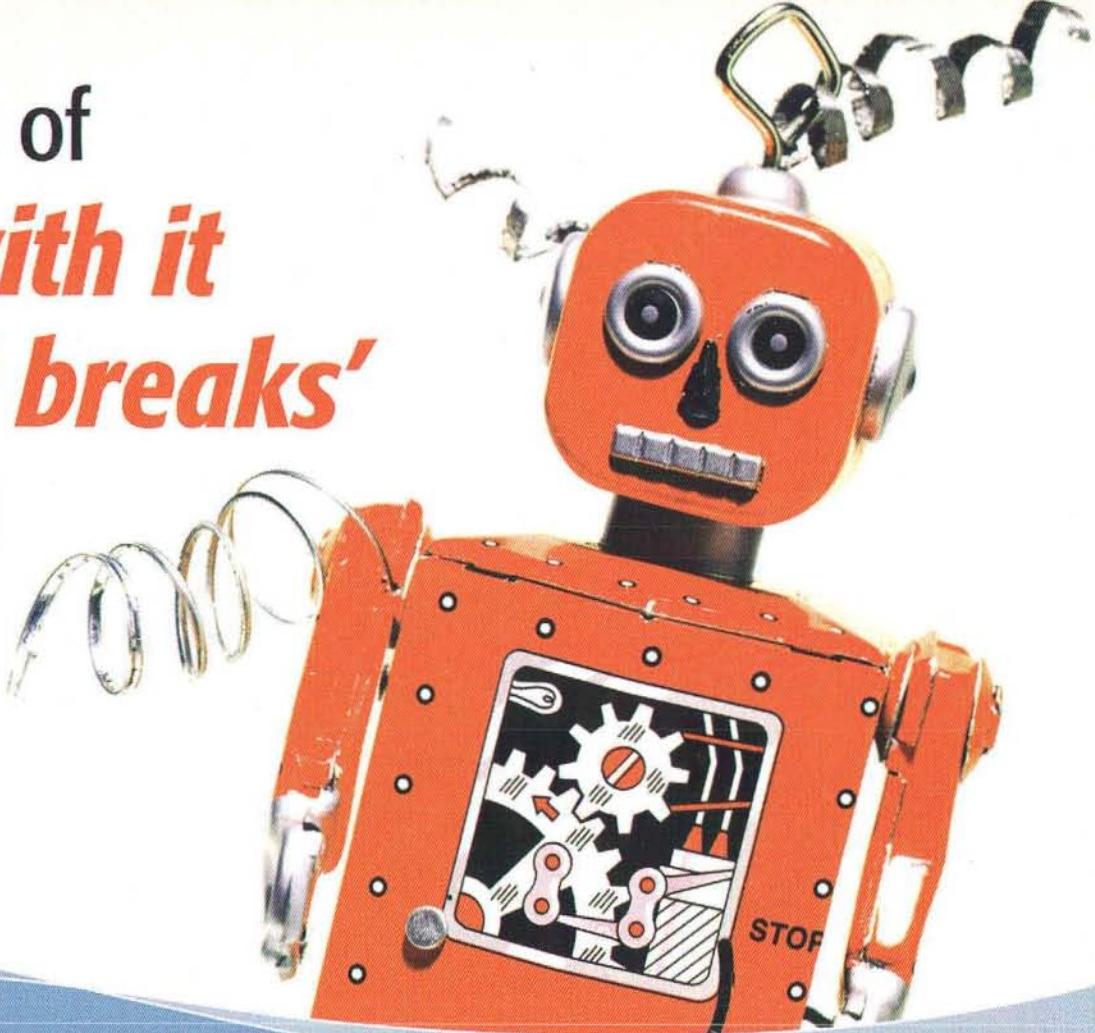
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## Next Steps and Resources

### Documentation and Examples

If you are a serious QuarkXPress user, and you are planning to make yourself more efficient by introducing AppleScript automation into your workflow, there are several ways to get started. First, be sure to view Quark's *Guide to Apple Events Scripting* documentation. This is installed along with QuarkXPress, and can be found in the *Documents > Apple Events Scripting* folder in the main QuarkXPress folder.

Also, in the *Apple Events Scripting* folder, you will find a sample *Layout Construction* AppleScript file, which contains some example code to get you started. This script is unlocked and editable for you to modify, or to borrow code for insertion into your own scripts.

If you're interested in finding even more documentation on scripting QuarkXPress, you may want to check out X-Ray Magazine at <<http://www.xraymag.com/>>. X-Ray is geared entirely for Quark users, and (excuse the shameless plug), in addition to writing for MacTech, I also write a regular AppleScript column for X-Ray on... you guessed it, AppleScripting QuarkXPress.

If the above resources still can't contain your quest for more QuarkXPress AppleScript knowledge, then you should check out *AppleScripting QuarkXPress*, by Shirley Hopkins, which is available (although in short supply) from Amazon.com at <<http://www.amazon.com/gp/product/0970726503/>>.

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### Expanding QuarkXPress' AppleScript Support

Inevitably, you may encounter things that you wish were scriptable in Quark, but unfortunately, simply are not. Well, before you get too upset, you may want to check around to see if there is a third-party XTension that will add the functionality that you need. Quark's XTension architecture allows developers to create their XTensions that actually add new AppleScript terminology to Quark's dictionary. One such developer is Em Software (<http://www.emsoftware.com>), whose Xcatalog and Xdata XTensions are scriptable, and can allow users to automate quite complex document construction workflows. Gluon (<http://www.gluon.com>) is another developer that offers a number of scriptable XTensions for QuarkXPress.

### Recording AppleScript Code in QuarkXPress

The dream of anyone getting started on scripting QuarkXPress, is to be able to record tasks they perform manually using the Script Editor's record functionality. Unfortunately, QuarkXPress (like most applications) does not support AppleScript recordability. To get around this limitation, however, be sure to check out ScriptMasterXT, a commercial XTension for QuarkXPress, available from Jintek, LLC (<http://www.jintek.com>). ScriptMasterXT adds AppleScript recordability, as well as numerous useful AppleScript commands, to QuarkXPress. A limited demonstration version of ScriptMasterXT is available for download from the Jintek website.

### In Closing

We have really only scratched the surface of scripting QuarkXPress. There are many, many more tasks that can be automated in Quark using AppleScript, and I would encourage you to continue exploring them on your own. With a little work, it's easily possible to automate even the most complex Quark-based workflows using AppleScript.

Until next time, keep scripting!



### About The Author

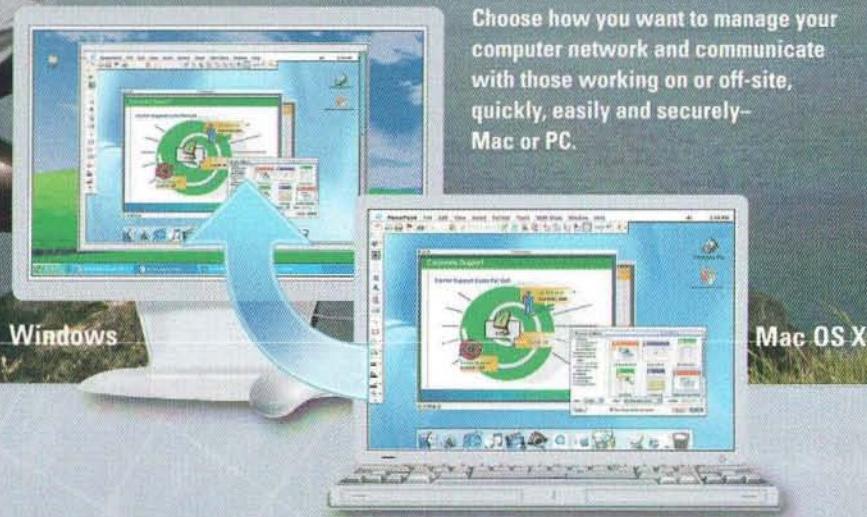
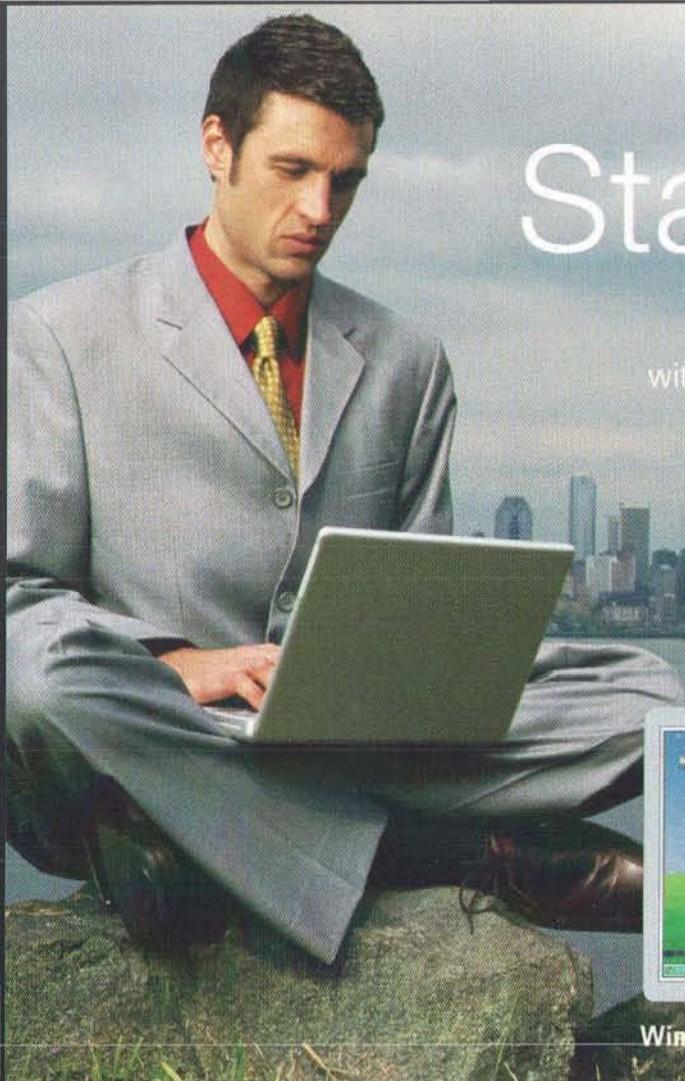


**Ben Waldie** is the author of the best selling books "AppleScripting the Finder" and the "Mac OS X Technology Guide to Automator", available from <<http://www.spiderworks.com>>, as well as an AppleScript Training CD, available from <<http://www.vtc.com>>. Ben is also president of Automated Workflows, LLC, a company specializing in AppleScript and workflow automation consulting. For years, Ben has developed professional AppleScript-based solutions for businesses including Adobe, Apple, NASA, PC World, and TV Guide. For more information about Ben, please visit <<http://www.automatedworkflows.com>>, or email Ben at <[ben@automatedworkflows.com](mailto:ben@automatedworkflows.com)>.

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# VERSION CONTROL ON A BUDGET

## A Non-Developers Introduction to CVS

By Jose R.C. Cruz

### Introduction

When working on a computer-based project, you often rely on some form of version control system to keep track of all work and changes made to your project files. Such a system allows you to create official archives of your project and provide you with an isolated local copy that you can work on. It also allows you and other participants to coordinate your contributions to the project.

This article will introduce you to the basic concept of version control using the open-source tool, CVS. This tool is preinstalled in all versions of Mac OS X, and is accessed via the Terminal application located in the /Applications/Utilities directory.

### The Concurrent Versioning System

#### What is CVS?

The Concurrent Versions System (CVS) is an open-source software tool that provides centralized version control on POSIX-compatible systems. It is originally developed from an earlier versioning system called the Revision Control System (RCS), which can manage changes made to individual files, but not to whole projects.

The source code to CVS was released for public distribution in June 1986. An improved version of the tool was released on April 1989 under the GNU Public License. The version of CVS that comes installed in Mac OS X is version 1.10 (for OS X 10.3.9), and version 1.11.18 (for OS X 10.4).

#### Advantages and disadvantages of CVS

One notable advantage of CVS is that it is available for a wide variety of operating systems. It is also one of the few version control systems that behave consistently across platforms. For example, CVS can store and maintain its project archives on a Linux server, while providing local copies of its archives for Mac OS X and Windows XP users.

Another advantage of CVS is that it works independently of your project environment. For instance, you can use CVS to maintain archives of your XCode project as well as your Adobe GoLive web pages. Some might find this lack of tight integration to be a hindrance however. But, if your project environment is scriptable, you can always use your favorite scripting tool to integrate CVS with your environment.

Finally, CVS is much more forgiving than most commercial packages. In fact, these commercial packages use concepts and procedures similar to that of CVS. Once you have mastered

using CVS, your learning curve would be less steep, when you upgrade to a commercial and more sophisticated system.

The biggest disadvantage of CVS is that it is originally designed to manage text files. Its support for binary file formats is rudimentary at best. Files such as spreadsheets, JPEGs, etc., are often stored in their entirety, causing the project archive to slowly grow to unmanageable sizes. However, this limitation is not unique to CVS. Many commercial packages provide limited support, if any at all, for binary files.

Another disadvantage is that CVS is designed to handle ASCII text files. It has problems dealing with Unicode and non-ASCII files. However, this limitation is being addressed in the open-source tool, Subversion, which is being developed as a potential successor to CVS.

Yet another (though minor) disadvantage of CVS is that it is still primarily a command-line tool. If you are more comfortable working with a point-and-click system, there are a number of free and open-source solutions that provide a graphical user interface to CVS. A notable example is the **MacCVSClient X** application, which is written by J. Bullmann, and available at the URL:

<<http://www.heliancoo.net/MacCVSClient>>

### Preparing the Repository

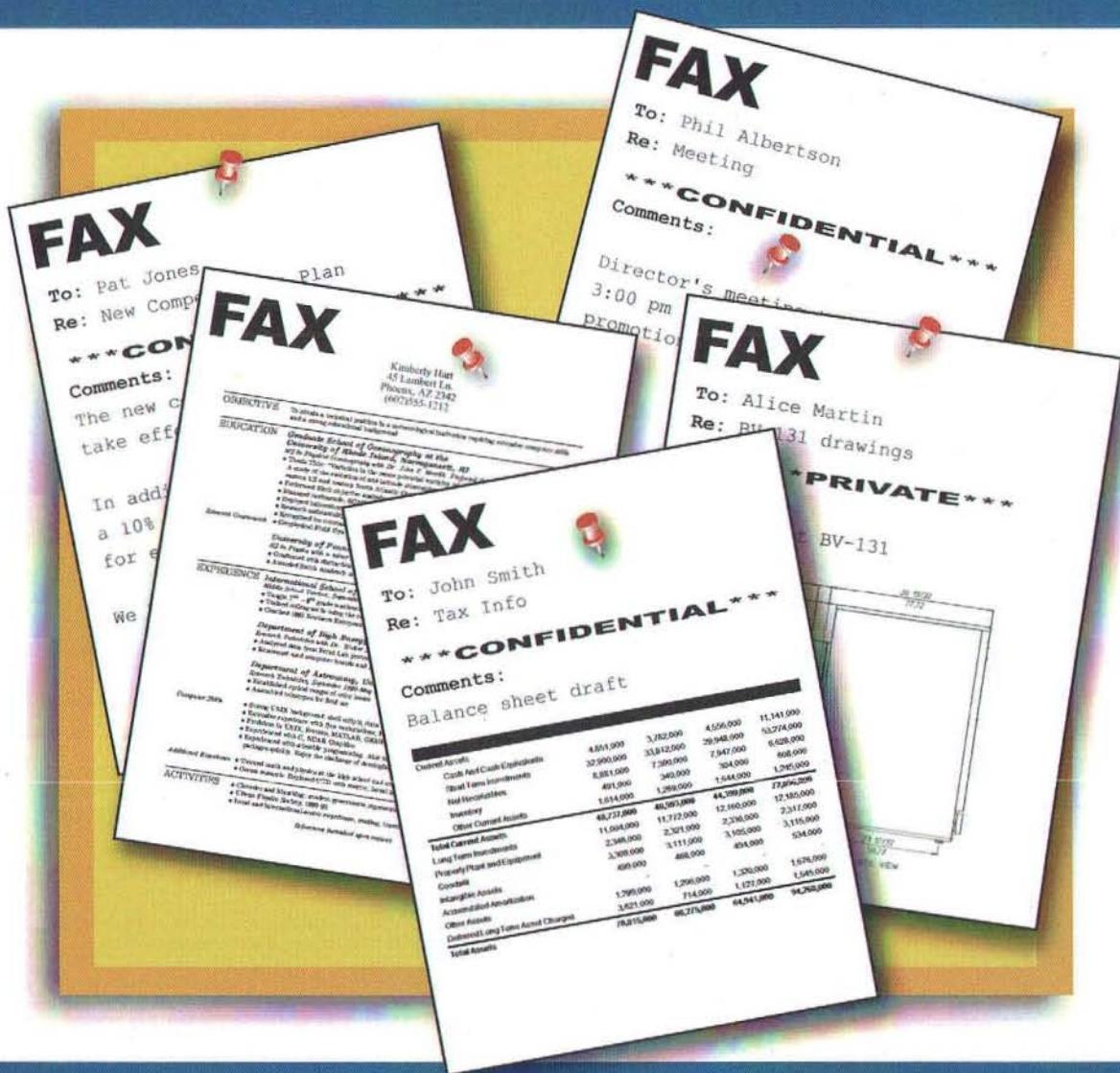
#### The CVSROOT environment variable

Before using CVS, you first have to set the CVSROOT environment variable. This is used to store the default location of the CVS repository. This article assumes that you are using bash as your shell environment. You can find out which shell you are using by launching the Terminal application and typing printenv SHELL at the command prompt. If you are not using bash, type man <shell\_name> at the command prompt for instructions on how to configure your own shell environment.

First you need to create the shell startup file, .bash\_profile in the root of your home directory. Use your favorite text editor to create this hidden file. Some recommended editors are BBEdit, Smultron, emacs, and the venerable vi. Insert the following script at the beginning of the file and then restart the Terminal application.

```
# Start of CVS configuration
CVSROOT = /Users/Shared/Projects
export CVSROOT
#..end of CVS configuration
```

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This script tells CVS to store its repository in /Users/Shared/Projects. Every CVS command thereafter will affect the project archives stored at this location.

You can always assign your own directory path for your CVS repository. Alternatively, you can override the default location by using the -d global option whenever you type a CVS command.

## Creating and configuring the repository

After setting the CVSROOT variable, type cvs -init to initialize the repository. Once successful, CVS will create a directory named CVSROOT at the location specified by its environment variable. It will also populate the directory with a number of files (Table 1/Table 1) that are used to configure the repository.

Amongst these files, the cvswrappers file is the one that tells CVS how to store each project file. By default, CVS will convert the line ending characters found in each file to a form appropriate for the host system. It will also attempt to expand any keywords that it finds in each file. However, these behaviors can corrupt a purely binary file. As created, cvswrappers contains only comments.

Take a look at the all-text cvswrappers to customize it for your needs. You need to update the cvswrapper file if you plan to store binary files in your project archive. If, for example, you want to include JPEG and GIF files to your archive, add the following lines to the file.

```
*.jpg -k 'b' -m 'COPY'  
*.gif -k 'b' -m 'COPY'
```

These will tell CVS to store these binary files in their entirety.

## Adding a project

You should now have a working CVS repository. To add your project to the repository, navigate to the location of your project directory by typing cd «project\_directory\_location» at the Terminal prompt. Then use the import command to add your website project to the repository.

```
cvs import -m "«short description of your project»"  
«archive_name» «user_name» «release_tag»
```

Note: That entire command line is typed as a *single* line. The ↵ character is there only to indicate the continuation of the line.

For example, if your website project directory is in

```
/Volumes/Users/myHome/SitesmySite
```

type cd /Volumes/Users/myHome/Sites at the Terminal prompt. Then use the import command to add your website project to the repository.

```
cvs import -m "«short description of your project»"  
«archive_name» «user_name» «release_tag»
```

Note that entire command line is typed as a *single* line. The ↵ character is there only to indicate the continuation of the line.

So using the above example, you would Then, archive your website project by typing

```
cvs import -m "My website project"  
"mySite Sites myName version_1_0
```

at the prompt.

CVS will then generate a series of messages as it parses each and every file and subdirectory in your project directory, as while creating it creates the project archive.

When successful, your project will be stored in the same directory as CVSROOT under «archive\_name» (Figure 1/Figure 1/Figure 1). However, if you decided not to continue with this archive, use the

Finder to navigate to the directory where CVSROOT is stored. Then delete the «archive\_name» directory by dragging it to the Trash and choosing Empty Trash from the Finder menu.

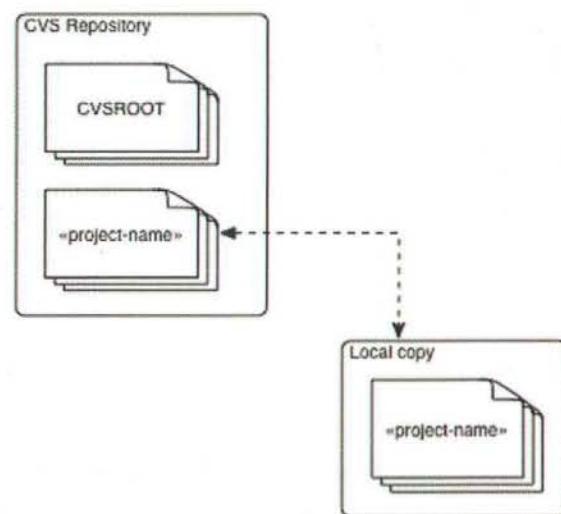


Figure 1. Structure of a CVS repository.



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# Working with the CVS Project

## The CVS version number

CVS uses an internal version number system to keep track of which project file has been modified or branched. In its basic form, a CVS version number consists of at least two fields of the non-zero positive number, with each field delimited by a period (ASCII 0x2e). The format assumed by the version number is

`<project_number>.<revision_number>[.<branch_number>]`

CVS increments the `<revision_number>` field each time you checked in a modified file back into the archive. However, when you create a branch off a specific file, CVS adds a `<branch_number>` for that branch. It then updates the field each time you checked in a modified version of that branched file. Additional `<branch_number>` fields are also added whenever you append new branches to that same file.

The `<project_number>` field remains mostly unchanged throughout the project. In fact, you must avoid interfering with the internal version system to prevent any orphan files or branches. If you want to assign your own version number to the project archive, use the `cvs tag` command, which will be covered later on.

## Checking out a project or file

Now that you have a project archive in the CVS repository, you first have to check out retrieve a copy of that archive for you to work on. You do this by typing `cvs checkout <project_name>` at the Terminal prompt. Alternatively, if you want to check out a specific project file, type `cvs checkout <project_file_path>`, where `<project_file_path>` is the directory path of the file with respect to the main project directory.

CVS will then create a local copy of the project or file on your present working directory. Each directory in this copy will be accompanied by a CVS subdirectory, which is used to store information about your local copy (Figure 3/Figure 2/Figure 2).

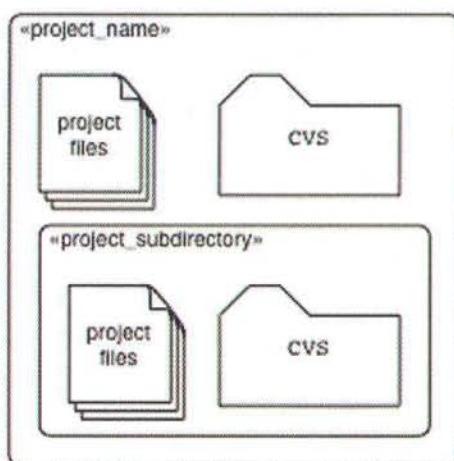


Figure 2. Structure of a checkout CVS project.

Once you have checked out your local copy, your username is automatically added to the CVS log. Other people working on the same project archive as you are, will be aware of your presence. So, if you are done with your local copy, type `cvs release <project_name>` at the Terminal prompt. CVS will first check and prompt you, if you have any modified files in your copy. Once you answered YES to the prompt, it will no longer keep track of your copy. It will also remove you from its user log.

So, using the website example, you would type `cvs checkout Sites`, to retrieve a copy of your website project from the repository. The project directory, `Sites`, will then be created in your present working directory, and it will contain at least one CVS subdirectory. Once you are done making changes to your website, type `cvs release Sites` to inform CVS to cease keeping track of your local copy.

## Adding a new file or directory

Suppose you have created a new file or directory in your local copy, and you want to add it to the project archive. To do so, type `cvs add <new_directory_path>` at the Terminal prompt. Now unlike most commands, CVS does not automatically execute the add command. Instead, it queues the request into its command buffer. This ensures the integrity of your project archive by giving you a chance to cancel the request.

If you have decided to cancel the request to add the new file or directory, first move or delete the file or directory from your project directory. Then, type `cvs remove <new_directory_path>` at the Terminal prompt. This will tell CVS to remove the add request for that file or directory from its command buffer.

So, let us assume that you have added the file, `hello.html`, to your `Sites` project directory. To add that file to the project archive, type `cvs add Sites/hello.html`. To cancel the add request, remove the `hello.html` file from the `Sites` directory. Then type `cvs remove Sites/hello.html` to remove the request from the command buffer.

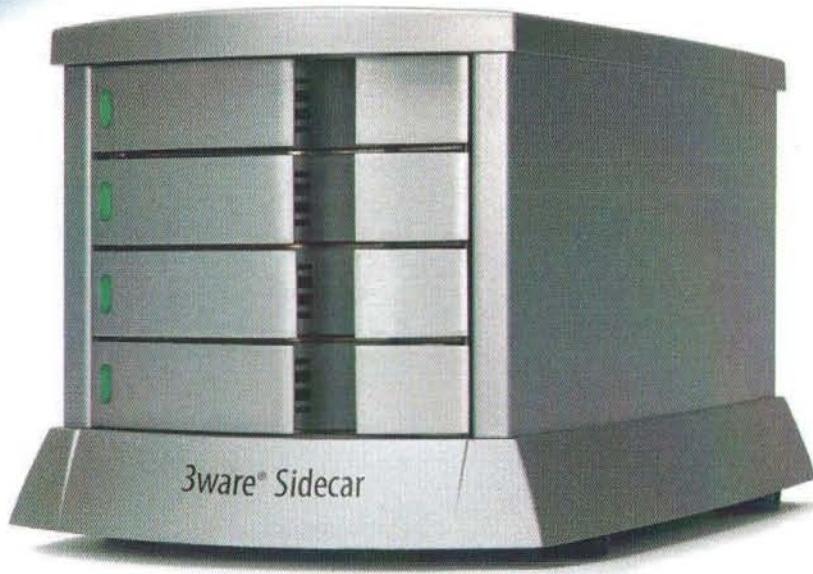
## Updating your copy

As you work on your local copy, you may want to check your copy against the project archive periodically. Since CVS is designed from the start to support multiple users, others may have made changes that could impact your own. As you work on your local copy, you may want to check your copy against the project archive periodically. Naturally, this does not apply if you are the only one working on the project.

To check your copy against the archive, type `cvs update` at the Terminal prompt. You can also type `cvs update --d`, to include subdirectories that are present in the archive, but not in your local copy.

CVS will then scan every file in your local copy and compare their contents with those in the archive. If it comes across an *unmodified* local file older than the one in the archive, CVS will attempt to replace that file with the latter. If, however, it comes across one that is modified, CVS will attempt to merge the local file with the one in the archive. It will then inform you

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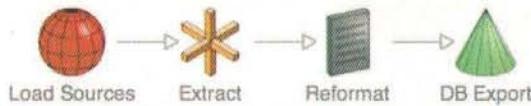
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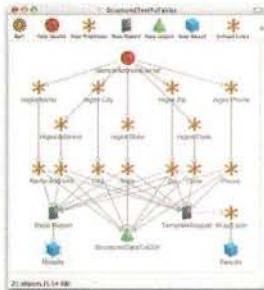
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of any conflicting changes, should the merge process fail. It will also inform you of any files or directories on your local copy that are newer or non-existent in the project archive.

### Reverting to a previous version

What if you have made a mistake when editing one of your local files? What if you decided to completely discard your changes for whatever reason? You can revert to the previous version of a project file by using the `cvs update` command.

First you need to know which previous revision of the file you want to revert (see the `cvs log` command later in this article). Once you have that established, type

```
cvs update -j «new-revision-number» -j «old-revision-number» «filename»
```

at the Terminal prompt to start the reversion process.

CVS will first retrieve both revisions and then perform a join operation between the two files. The joined result then replaces your local copy. At this point, you can decide if you want to commit your reverted copy back into the project archive.

### Committing your changes

You have made changes to some files on your local project. You have also added new files and/or subdirectories to your project as well. After considerable testing and review on your part, you are now ready to submit your changes to the project archive.

To do so, type `cvs commit -m "reason for committal"` at the Terminal prompt. CVS will then scan your local project, and update any files in the archive with your changes. It will also execute any addition or removal requests that are queued in the command buffer. However, if you only want to update a single file or subdirectory in the project archive, type `cvs commit -m "reason for committal" <file_or_directory_name>` at the prompt.

Again, let us assume that you have changed the title of your `hello.html` file, and then saved your changes. To commit that modified file to the archive, type

```
cvs commit -m  
"Changed the title of the hello.html file"  
Sites/hello.html
```

at the prompt.

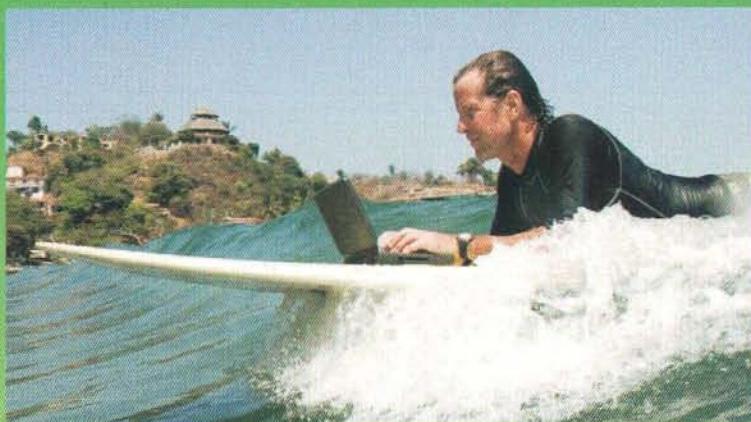
Always make sure to provide a brief and concise reason whenever each time you use the `cvs commit` command. Not providing a reason for the committal action is generally frowned upon in normal practice. It compromises the change history log of your project archive as well makes it difficult for you to revert to a previous version.

Also, always pay attention to the status messages (Listing 1) displayed by CVS during the committal process. If CVS encountered any errors, it will immediately stop the committal process after the last successful file or directory update. To preserve archival integrity, avoid attempting further committals until you (or your project manager) has isolated and resolved the error.

You also may want to avoid executing a committal request when the project archive is being backed up or undergoing

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maintenance. Consult your colleagues for internal rules governing the committal process.

### **Listing 1. Sample output of the cvs commit command.**

```
Checking in Sites/hellohome.html;
/Users/Shared/Projects/Sites/helloome.html,v  <-
home.htmhello.html
new revision: 1.4; previous revision: 1.3
done
```

### **Reverting to a previous version**

What if you have made a mistake when editing one of your local files? What if you decided to completely discard your changes for whatever reason? You can use the cvs update command to revert to the previous version of your files.

First, you need to know which previous revision of the file you want to revert to (see the cvs log command later in this article). Once you have that established, remove the file that you want to revert from, and type cvs update -r «revision\_number» «filename» at the Terminal prompt. CVS will first warn you that you are missing a file, and then promptly update your local copy with the correct file.

On the other hand, if you have already committed your changes to the archive, type

```
cvs update -j «new_revision_number»
           -j «old_revision_number» «filename»
```

at the prompt to start the reversion process. CVS will first retrieve both revisions and then perform a join operation between the two files. The joined result then replaces your local copy. At this point, you can decide if you want to commit your reverted copy back into the project archive.

Using the website example, if your hello.html file is at version 1.4 in the archive, but you want to revert to version 1.3, type cvs update -j 1.3 -j 1.3 Sites/hello.html to revert to the desired version.

### **Exporting the project**

Once you (and your colleagues) have finished submitting all your changes to the project archive, you should now you are now ready to export a copy of the archive for public distribution. This could mean preparing a software project for final compilation, an XML document for printing, or web pages a website for uploading.

First you prepare the project archive for exporting, by assigning it with a release tag. First, navigate to the project directory and type cvs tag «release\_tag» at the Terminal prompt, where «release\_tag» would be your project's official version number. Make absolutely sure that no one is allowed to perform any committals while you are assigning the release tag. Otherwise, the wrong files may get tagged in the process.

Once you have assigned the tag, type

```
cvs export --r «release_tag»
           «export_destination» «project_archive»
```

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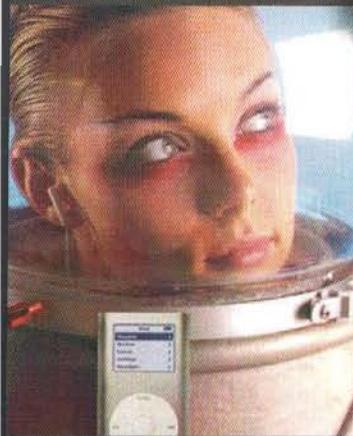
\$32

< 1 Year



2 Years >

\$64

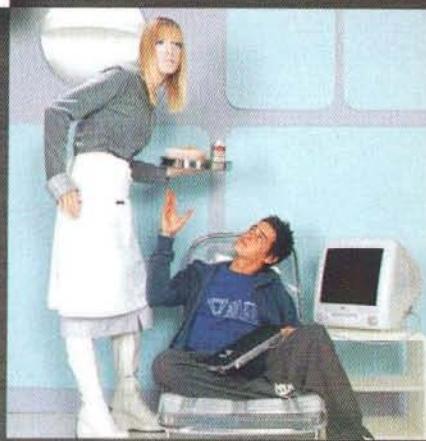


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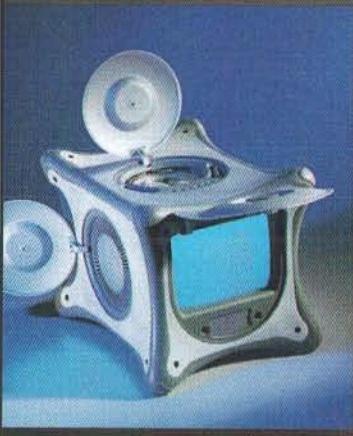


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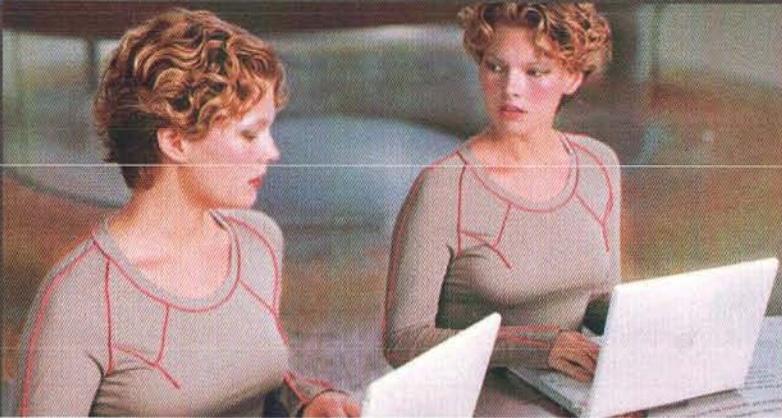
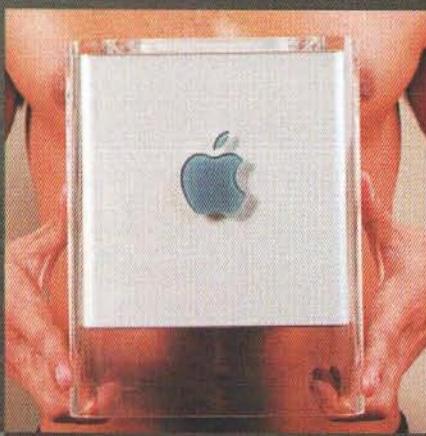
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at the Terminal prompt to export the project to the «`export_destination`» directory..

For example, if you want to export the website project, first navigate to the Sites directory by typing `cd ~/Sites` at the Terminal prompt. Then type `cvs tag 1_0GM` to assign the website with a release tag of 1.0GM.. Finally, type

```
cvs export -r v1_0GM /Volumes/Users/Public Sites
```

to export the entire website project to the directory `/Volumes/Users/Public`.

Make sure that your release tag contains only alphanumeric characters and/or an underscore. Also, make absolutely sure that no one is allowed to perform any committals while you are assigning the release tag. Otherwise, the wrong files may get tagged in the process.

Unlike a checked out project, an exported project does not contain the CVS subdirectories used to keep track of project changes. Any changes made to an exported project will not be committed back into the project archive..

Furthermore, you cannot update an exported project with the latest changes from the archive. If you want to get the latest changes made to the archive, you will have to repeat the entire export procedure.

### Streamlining the CVS process

Since CVS is a command-line tool, you may have noticed that using it involves a considerable amount of typing. You can reduce the amount of typing involved by using the appropriate command synonym. For example, instead of `cvs checkout` to check out a

copy of the archive, use `cvs get` or `cvs co`. Also, instead of `cvs update` to run an update check, use `cvs upd` or `cvs up`.

You can get a list of other CVS command synonyms by typing `cvs --help-synonym` at the Terminal prompt.

You can also reduce the amount of typing by using the `.cvsrc` startup file (Listing 3Listing 2Listing 2) to assign the default options for each CVS command. You can use your favorite text editor to create and edit this hidden file in your home directory. Make sure to restart the Terminal application in order for the changes to take effect.

A typical CVS command line follows the format of

```
cvs «global_options» «cvs_command» «command_options».
```

So each line in the `.cvsrc` file would be written down as `«cvs_command» «command_options»`. Note that, if you have an entry of `cvs «global_options»` in the file, those options apply to all command sessions. You can always override these default options by adding a `-f` option to your CVS command.

For additional information about CVS command options, type `man cvs` at the Terminal prompt.

### Listing 2. Sample contents of the `.cvsrc` startup file.

```
cvs --q --d "/Users/Library/Shared/Project/"  
checkout --d "~/MyProject" --P  
commit --l  
export --f --P
```

## Monitoring a CVS project Tracking with sticky tags

As mentioned earlier, CVS uses an internal version number system to keep track of the files contained in your project archive. You can then specify which revision of the file you want to be updated to by using the `-r` command option. For example, typing

```
cvs update -r 1.1 Sites/homehello.html
```

updates your local copy of `home.html` against version 1.1 of that same file in the archive.

A more flexible approach of keeping track of the archived files is through the use of *sticky tags*. Sticky tags enables you to tell CVS which branch or revision of the project archive you want to work on. You can use sticky tags to protect parts of your local copy from changes submitted to the archive. For example, you can tell CVS that your local copy uses version 1.2 of a specific file even though a new version of that file is available.

To set a sticky tag, type `cvs checkout -r <revision_number> <project_name>` when checking out a copy of the project archive. Alternatively, you can type `cvs update -r <revision_number> <project_file_path>` if you want to perform an update check at the specified revision.

You can also use dates as your sticky tag by using the `-D` command option. The format used by CVS for dates is “`dd mmm yyyy`” where `mmm` is the three-letter month abbreviation. For example, typing

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```
if (your_website_stats == ???) {  
    try_visistat = free;  
    setup = no_brainer;  
    web_stats = !!!;  
}  
else {  
    no_clue = true;  
}  
  
//REAL-TIME WEBSITE TRACKING  
goto = www.visistat.com;
```



```
cvs update -D "15 Mar 2006"
Sites/styles/defaulthello.html.css
```

updates your local copy of default.csshello.html to the one dated March 15, 2006 in the archive.

In either case, sticky tags permanently link your local copy to that version of the archive. Changes submitted to the archive will not appear on your local copy whenever you perform an update check. Also, for integrity reasons, you cannot commit any changes you have made until you clear all sticky tags. To do so, type `cvs update -A` at the Terminal prompt. Make sure to test your changes for errors and possible conflicts before submitting them to the archive, using the `cvs commit` command.

### Tracking the differences

As you work on your local copy, you may want to check it against the project archive periodically for any potential conflicts. To display the differences between your local copy and the archive, type `cvs diff <project_name>` at the Terminal prompt. Alternatively, if you want to display only the differences in a specific file, type `cvs diff <project_filename>` instead.

In either case, CVS will parse your local copy and compare its contents against the archive. It will then display a report (Listing 5Listing 3Listing 3) showing what has changed between the two. By examining this report, you can identify any potential conflicts between your local copy and the archive.

### Listing 3. Sample output of the `cvs diff` command.

```
Index: Sites/styles/default.csshello.html
```

```
RCS file:
/Users/Shared/Projects/Sites/styles/default.csshello.html,v
retrieving revision 1.2
diff -r1.2 default.csshello.html
3c3
<      «contents of the archived revision»
-
>      «contents of the local revision»
```

You can also just type `cvs update` at the prompt to tell CVS to go ahead and update your local copy with the archive. If the archive contains changes that conflict with your copy, CVS will mark those changes using the format shown in Listing 7Listing 4Listing 4. You then resolve the conflict by manually merging the two changes. Make sure to consult your colleagues for standard procedures on conflict resolution.

### Listing 4. Format used by CVS to mark conflicting changes.

```
<<<<< <filename with conflicting changes>
  <changes in the local revision>
  -----
  <changes in the archival revision>
>>>>> <archival_revision_number>
```

### Tracking with logs

You can use CVS to keep track of the revision state and history of your project. The one you probably use most often is

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the cvs status command.

The cvs status command displays the current state of your local copy compared to the archive. It also displays the version number of your local files as well as any sticky tags you have assigned to those files. This command is normally used prior to cvs update, to give you an idea of how the update process might affect your local copy.

To display the current state of your local copy, type cvs status at the Terminal prompt. If you want to view the status of a particular file, type cvs status «project\_file\_path» at the prompt. In either case, CVS will generate a status log similar to the one shown in Listing 9Listing 5Listing 5. This log shows the current state of each file in your local copy, its sticky tags, and its CVS version number.

### **Listing 5. Sample output of the cvs status command.**

```
File: news2002.htmhello.html      Status: Up-to-date
Working revision: 1.1.1.1 Wed Mar 1 18:53:53 2006
Repository revision: 1.1.1.1
/Users/Shared/Projects/Sites/pages/archives/news2006.htmhello.h
tml.v
Sticky Tag: MkI (revision: 1.1.1.1)
Sticky Date: (none)
Sticky Options: (none)

File: lgp150.padfooter.html      Status: Up-to-date
```

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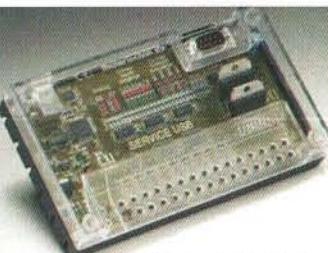
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```
Working revision: 1.1.1.1 Wed Mar 1 18:53:53 2006
Repository revision: 1.1.1.1
/Users/Shared/Projects/Sites/pages/mpad/lgp150.padfooter.html.v
Sticky Tag: MkI (revision: 1.1.1.1)
Sticky Date: (none)
Sticky Options: (none)
```

cvs status: Examining Sites/styles

```
File: default.css      Status: Up-to-date
```

```
Working revision: 1.1.1.1 Wed Mar 1 18:53:53 2006
Repository revision: 1.1.1.1
/Users/Shared/Projects/Sites/styles/default.css.v
Sticky Tag: (none)
Sticky Date: 2006.03.15.08.00.00
Sticky Options: (none)
```

Another command that you can use is the cvs log command. This command allows you to display a revision history log of each file in your local copy. The log shows the location of the archived file, its current and previous version numbers, and its assigned tags. Also, for each revision, the log reveals the name of the user who worked on the file, the number of lines added or removed, and a description of what has been changed in that file. Note that, you can only use the cvs log command if you have checked out the project from the archive.

To display the revision history of a file in your local copy, type cvs log «project\_file\_path» at the Terminal prompt. If you want to display the revision history of the entire project, type cvs log «project\_name» at the prompt. CVS will then generate a revision history log similar to the one shown in Listing 11Listing 6Listing 6.

### **Listing 6. Sample output of the cvs log command.**

```
RCS file: /Users/Shared/Projects/Sites/hello.html.v
Working file: Sites/hello.html
head: 1.4
branch:
locks: strict
access list:
symbolic names:
  v1_OGM: 1.3
keyword substitution: kv
total revisions: 4; selected revisions: 4
description:

revision 1.4
date: 2006/04/05 17:55:34; author: kuronke; state: Exp;
lines: +1 -1
Updated the body of hello.html

revision 1.3
date: 2006/04/04 19:18:45; author: kuronke; state: Exp;
lines: +1 -1
Added an entry to the body

revision 1.2
date: 2006/04/04 19:17:54; author: kuronke; state: Exp;
lines: +1 -1
Added an exclamation point to the title.

revision 1.1
date: 2006/04/04 19:03:54; author: kuronke; state: Exp;
Added the hello.html file
```

```
RCS file: /Users/Shared/Projects/Sites/pages/booksale.htm.v
Working file: Sites/pages/booksale.htm
head: 1.5
```

3,248 hours typing code

184 hours finding that one bug

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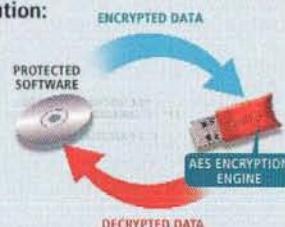
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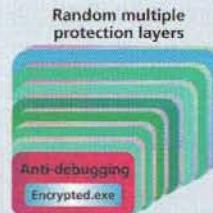


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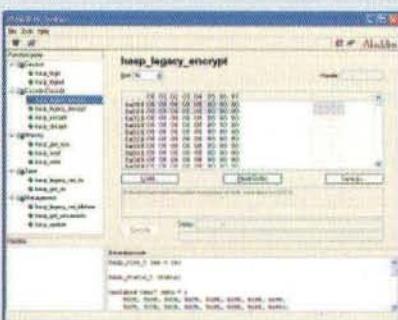
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Compatibility across platforms and environments	10%	93.3%	71%
<b>Overall Evaluation</b>	<b>87.3%</b>	<b>69.8%</b>	



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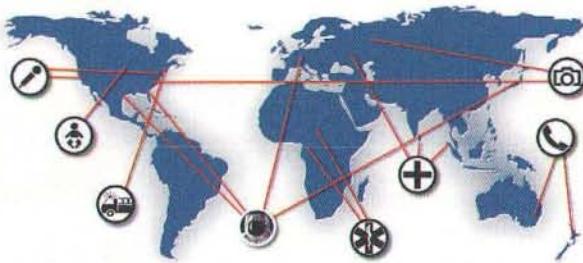
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```
branch:  
locks: strict  
access list:  
symbolic names:  
  MkIa: 1.5  
  MkI: 1.1.1.1  
  anarakis: 1.1.1  
keyword substitution: kv  
total revisions: 6; selected revisions: 6  
description:  
  
revision 1.3  
date: 2006/03/03 19:34:47; author: user1; state: Exp;  
lines: +1 -1  
Removed the conflict data  
  
revision 1.2  
date: 2006/03/03 19:10:13; author: user1; state: Exp;  
lines: +1 -1  
Removed irrelevant information from the booksale page  
  
revision 1.1  
date: 2006/03/01 18:53:53; author: user2; state: Exp;  
branches: 1.1.1;  
Initial revision  
  
revision 1.1.1.1  
date: 2006/03/01 18:53:53; author: user1; state: Exp;  
lines: +0 -0  
Original website project
```

## Concluding remarks

The Concurrent Version System is a simple and cost-effective version control system that is bundled in every MacOS X release. It enables you and your colleagues to coordinate your contributions to the project while providing you the option to revert to a previous unaltered version of that same project. It also provides a number of features that allows you to keep track of various states of your project.

This article has only shown you the fundamental capabilities of CVS. If you are interested in learning more about the tool, especially its administrative and network features, you can consult any one of the online references listed at the end of this article.

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## About The Author

JC is a freelance engineering consultant currently residing in North Vancouver, BC. He divides his time between writing technical articles, and teaching origami to children at the local district public libraries.

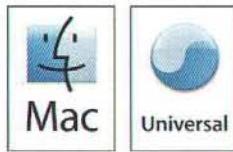


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**AppleScript Essentials**  
Introduction to Scripting FileMaker Pro  
by Benjamin S. Wadde

For the past couple of columns, we have discussed various ways to store and access data using AppleScript. One column provided an introduction to Database Events, a background application in Mac OS X 10.4 and higher, which allows AppleScripts to interact directly with SQLite databases for the purposes of storing and accessing data. Another column explored methods of storing and retrieving data using properties and property list files. This month, we are going to continue discussing data storage and access, this time, using Filemaker Pro, a third-party commercial database application.

For the purposes of following along with this month's column, if you do not own Filemaker Pro, you can download a fully functional 30-day trial from <http://www.filemaker.com/>

All AppleScript code covered in this month's column was written and tested with Filemaker Pro version 8.0.1. Therefore, some of the AppleScript terminology discussed, may not function with earlier versions of Filemaker.

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# Sharing Information Between Outlook & Entourage, and Vice Versa

By Paul T. Ammann

Corporate environments are known for behaving heterogeneous technology systems, environments and being able to move information between them different systems is very important. Another known fact about And, it's very common for a corporate environments is that to use Microsoft's Exchange server is the as the company's standard platform for email, scheduling meetings, setting up contacts, and sharing information through public folders.

Windows users frequently use Outlook to connect to Exchange. Many Mac users have standardized on Entourage. But, what happens if you want to share data between Outlook and Entourage.

In this article, I will introduce you to two utilities that will allow one to move information from Outlook to Entourage, and vice versa.

## Outlook2Mac

For those of you that don't know, .pst and .pab files are Microsoft's Outlook's way of storing email and addresses locally. The main benefit to Microsoft here is that it locks all of this data in an impenetrable fortress of a file that no developer has seemed to crack yet. However there are three ways I know of to get this data from your Outlook client (2000, 2001, and XP) into Entourage. Let's briefly take a moment to review our options. The two best options will require a PC, although Virtual PC, Boot Camp or Parallels, and Boot Camp will work fine as well.

1. The "official" Microsoft way requires you could upload all of that mail to the server, and the re-download it again. This has the benefit of being very straightforward, and relatively simple. However, the one reason that why most many people have a .pst in the first place is that they have more mail than the server will allow.
2. If you have too much mail to forward through your server, Tthird parties have outlinedhere is a Byzantine more complex procedure that involves moving the pst to a Windows PC, importing it into Outlook Express, importing that in Eudora, and then processing the

resulting mbx files into mbox files with some \$20 shareware ApplescriptsAppleScripts. Then you can drag and drop the results into Entourage. It should be noted though that this method will not import contacts or email attachments.

3. The best method I have foundwe've found to date is a commercial product from Little Machines called Outlook2Mac (O2M). This \$10 (yes, just \$10!) application runs on a PC and will convert whatever you want into mbox files that you can drag and drop into Entourage (as well as other mail clients) or any other Mac OS X mail client. It has a lot of flexibility and can export by folder and date range. It also will export with attachments and gives you the ability to filter the export by size and file type. Lastly, it will exportdo your contacts as well. This will be the best \$10 you will spend.

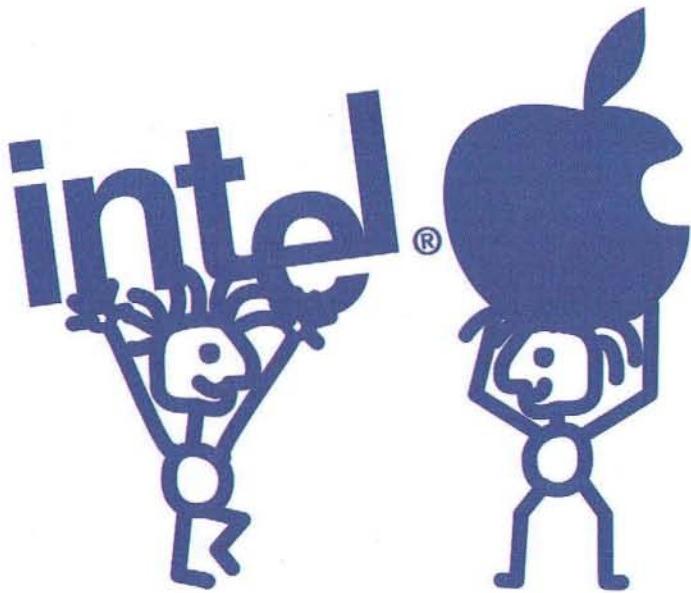
To install and start Outlook2MacO2M, you will need download the program and install it on a Windows PC that is running Outlook. Outlook2Mac O2M supports Microsoft Windows 95, 98, Me, NT4, 2000, XP or higher running Outlook 97, 98, 2000, 2003, or XP.

According Little Machine's Web site, it is recommended that you use Outlook2Mac O2M while Microsoft Outlook is open, because O2M runs a little faster if Outlook is already running. However, they caution you to not actively use Outlook while using Outlook2MacO2M. If you send mail, move folders, delete mail, or perform other Outlook actions while Outlook2Mac O2M is scanning Outlook or exporting your data, Outlook2Mac O2M might get confused and fail to finish its job, requiring you to restart it.

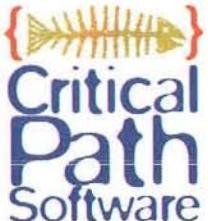
The beauty of Outlook2Mac is the variety options available at your fingertips:

- You can pick one folder, or multiple folders (see Figure 1, page 38).
- You can convert all email regardless of date, or select range of dates.
- For large attachments, you can tell Outlook2Mac to skip file attachments of a specific size, or convert everything.

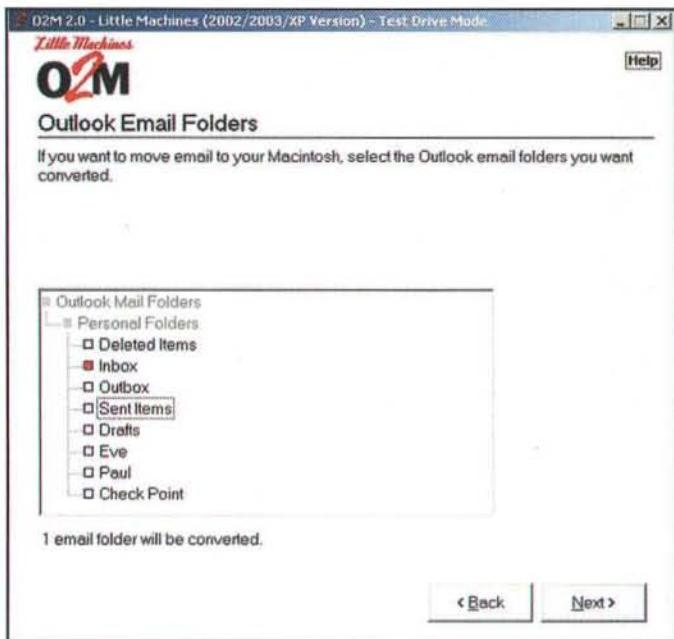
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- Because some email file attachments, such as .exe and .bat files, may only be compatible with Windows, you can select the kinds of file attachments that will not be transferred to Entourage.
- When converting your calendar, you have the option of selecting all your appointments or with a date range.
- Additionally, you can choose to have your calendar converted to an Apple iCal file.
- When you send or receive an Outlook meeting invitation, the invite contains the names of everyone who is invited. Outlook2Mac will try to convert these names into valid email addresses so you can replay or respond to invitations by email on the Mac.



**Figure 1: Selecting which folders to convert**

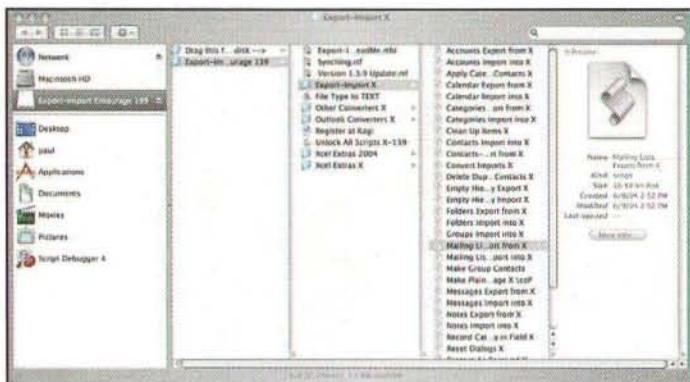
You can find straightforward directions on how to use Outlook2Mac O2M at <http://www.littlemachines.com/o2m/help/wizard.html>.

## From Entourage To Outlook

Converting information from Entourage to Outlook was a bit more of a challenge, and web searches don't yield a lot of great results on this. I searched a variety of newsgroups and Web sites through Google, after looking in vain on Mactopia. One name came up: Paul Berkowitz, who has developed a number of specialized AppleScripts for Entourage.

Paul's invaluable Export-Import Entourage 1.3.9 is a collection of over 50 scripts to export and import almost everything — Contacts, Groups, Calendar Events, Tasks, Notes, Messages, Folders, Accounts, Signatures, Mailing Lists and Categories — from one identity of Entourage X or 2004 to any

other, to and from Entourage 2001, and to transfer Contacts, Calendar, Tasks and Notes to and from other PIM programs on the Mac and Windows, with special converters for Microsoft Outlook, Excel and other programs.



**Figure 2: Export-Import Entourage has many scripts to meet your needs**

The scripts enable archiving, restoration, and data synching or transporting. Some operations are not possible for all types of data, and some are not possible to or from programs that do not support the functions required. The Outlook and Other Converters transfer contacts, calendar, tasks and notes — there are instructions for transferring messages without scripts in the ReadMe.

Export-Import Entourage is shareware (\$20.00). You may use two copies of the same or different versions (2004/X and/or 2001) for one registration payment. There is a one-time free Demo mode for exporting and importing 25 contacts.

You can visit Paul Berkowitz Web site at <http://homepage.mac.com/berkowitz28>.

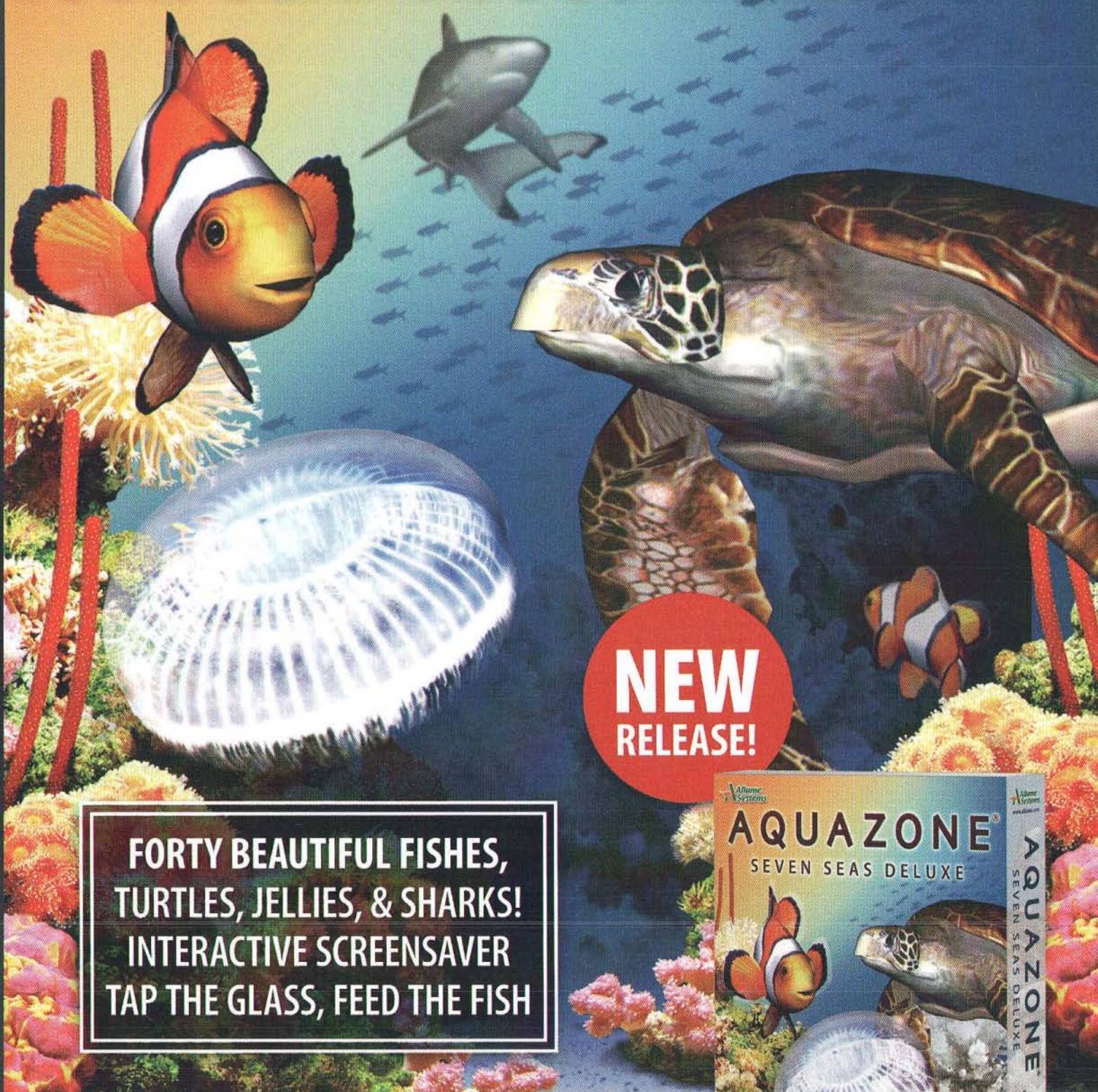
## Building on Entourage

Entourage does a lot, but many times you want to go even further. Fortunately, there is a way to *make* Entourage do practically anything that you want it to, by using AppleScript.

## About Entourage's AppleScript Support

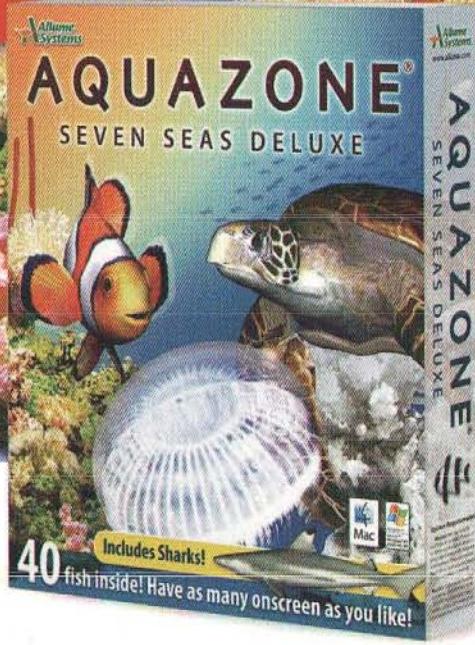
Entourage is very scriptable. It has an extensive AppleScript *dictionary*, which defines the AppleScript commands that the application will understand. Dictionaries also define all the *objects* that programmers can manipulate with AppleScript commands. Objects can be all sorts of things within Entourage, such as windows, contact records, individual fields, email account setups, calendar events, and so on. Because Entourage is so scriptable, programmers can write scripts to extend Entourage's capabilities in many ways, enabling the program to perform actions that it otherwise could not. For example, there's no way within Entourage to duplicate a calendar event. But you can easily download and install a script that will do just that.

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Teaching AppleScript is beyond the scope of this article, so unfortunately the rest of this article won't show you how to write your own AppleScript. But you will see how you can use the power of AppleScript within Entourage, even if you're not a programmer, by using scripts written by people who *are* experienced developers (like Ben Waldie, and his excellent AppleScript column every month in MacTech!).

## Finding and Installing Cool Scripts

You can download AppleScripts from many places on the Web, but there are a few sites that stand out.

- AppleScript Central ([www.applescript.com](http://www.applescript.com)) has a large collection of AppleScripts for both Entourage and many other programs. Updated frequently, this site should be your first stop when looking for useful AppleScripts for Entourage.
- Mactopia ([www.mactopia.com](http://www.mactopia.com)) is Microsoft's own Web site for all things Macintosh. A number of AppleScripts are available on the Downloads page of the site. Choose Help, Downloads and Updates to open the Mactopia Downloads page in your Web browser, and then look for AppleScripts.
- We are disappointed to report that the website of Allen Watson, a major contributor to AppleScript Central, is no longer available. While he has written over 200 scripts for

Entourage, they're now difficult to find, but are surely still floating around the web somewhere.

Once you've downloaded the scripts you are interested in, follow these steps to install them in the Users/*username*/Documents/Microsoft User Data/Entourage Script Menu Items folder. Once installed, confirm they're installed by switching back to Entourage and make sure that the script appears in Entourage's Scripts menu (Entourage's Scripts menu is the menu furthest to the right on Entourage's menu bar).

## Wrapping It Up

That's it – the t! The secret is out of the box. Regardless of whether you prefer Windows or OS X, being able to transfer information between systems can be paramount and the utilities profiled in this article will go a long way to information sharing a breeze. And, if you are looking to build on the base that Entourage provides, AppleScript may be a great solution for you.



## About The Author

*Paul T. Ammann has been working in IT for almost 20 years now. He is happily married to his wife Eve for 7 years, and lives in New Fairfield, CT. He finds writing the author's bio the toughest part the article. He can be contacted at [ptammann@yahoo.com](mailto:ptammann@yahoo.com).*

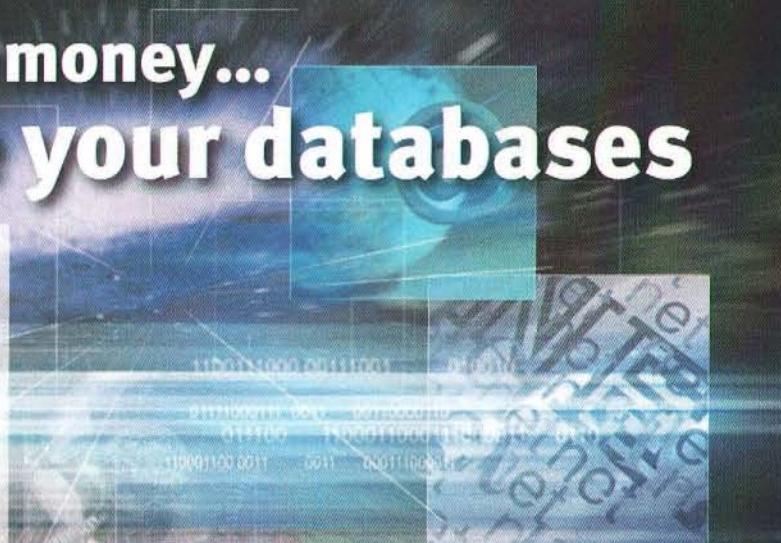
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By Jin Lin, Emmanuel Stein, and Jamie Ferri

## Introduction

There are many ways to improve the performance of websites built upon Apache, PHP and MySQL, from simple modification of configuration files to recompilation of the source code with customized settings for your situations. In this article, we will focus on each component of an AMP-based system in turn, and address common bottlenecks with simple solutions that can be readily applied to your particular implementation.

The performance of websites is measured by the speed with which it is able to service HTTP requests. As discussed in the April "Web Benchmarking 101" article, load testing tools like ApacheBench and JMeter can be used to gauge the performance of your web applications. In essence, these tools simulate heavy web traffic by instantiating multiple simultaneous requests, while measuring resultant load and response times. These reports are invaluable when benchmarking a server's response time and throughput across configurations.

## Apache Server

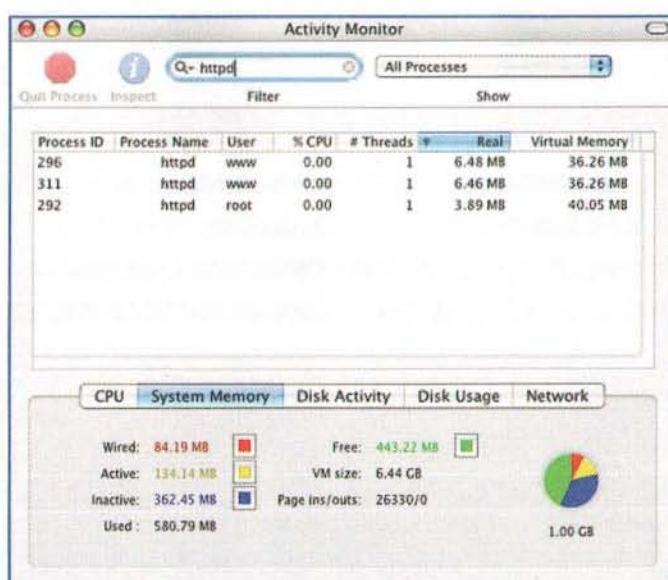
RAM is the most important variable that influences the performance of Apache server. As RAM usage goes up, frequent drive swapping increases the latency of HTTP requests. Each httpd process uses around 2-3 MB of RAM when serving static html pages, and as much as 15 MB when serving dynamic pages. Because the memory footprint of Apache processes grow to accommodate the quantity of content being served, they can rapidly take up an amount of RAM equal to the largest and most complicated script on your system. In other words, even if only 1% of your web pages are dynamic, each httpd process will grow to take up in excess of 15 MB of RAM, and will not release resources until the corresponding process dies. Therefore, by properly adjusting the number of httpd processes, the server spawns, as well as their lifespan, you can greatly boost the performance of Apache server.

The following options, within `httpd.conf`, can be tweaked to improve Apache's use of memory.

- `KeepAlive` - Creates persistent connections by keeping child processes busy while waiting for subsequent requests to be sent over the same connections. Persistent connections reduce the overhead for setting up and shutting down multiple HTTP connections. By enabling this option we can dramatically improve the render time for HTML pages with multiple images. Related options include `MaxKeepAliveRequests` (maximum number of requests that can be sent on a given connection before it is closed), and `KeepAliveTimeout` (number of seconds Apache waits for the next request before

closing connections). Both of these impose a limit on `KeepAlive` to prevent a client from holding resources too long. Therefore, it is best to set `KeepAliveTimeout` to a very low value such as 2 seconds. However, if you have more concurrent users than available child processes, or if the server is only serving dynamic pages, using `KeepAlive` will hurt overall performance and should be disabled.

- `MaxClients` - Limits the number of child processes the server can spawn or the number of simultaneous HTTP requests that can be supported. Once this limit is reached, additional attempted connections will be queued up to the number specified in the `ListenBacklog` directive. The default value for `MaxClients` is 500. Generally, it should be set to a number big enough to handle as many simultaneous requests as possible, but still small enough to ensure that there is ample physical memory for all processes. This will avoid excessive drive swapping. An easy way to test how many HTTP processes your system can handle is to launch Activity Monitor, enter `httpd` in the search field and make sure **All Processes** is selected. This will list the status of every `httpd` process running on your system (Figure 1). To get the value of `MaxClients`, divide the amount of available memory by the mean RAM consumption of the Apache processes.



**Figure 1. Activity Monitor - find out the RAM usage of httpd processes**

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- **MaxRequestsPerChild** - Sets the maximum number of requests a child process will service before the child process kills itself. This setting can reduce the total memory usage, and prevent memory leaks by forcing child processes to die and restart with a much smaller memory footprint. The default value in Mac OS X is 100,000. You might want to set it to a lower value if you find that some of your httpd processes are using too much memory.
- **MinSpareServers, MaxSpareServers** - Regulates how a parent process spawns child processes in order to service requests. Creating child processes is expensive. As long as the server is busy creating more child processes, it won't be able to serve user requests. If your site is event-driven, such that the number of connections fluctuates radically in short periods of time, you should increase the value of **MinSpareServers**. On the other hand, you should avoid setting **MaxSpareServers** too high since excess child processes will take up resources unnecessarily.
- **ExtendedStatus** - Useful for collecting server statistics such as the status and CPU usage of each child process, the number of requests per second, and more. This setting is enabled by default and is at the expense of extra system calls. With **ExtendedStatus** enabled, web server statistics can be accessed via `http://localhost/server-status`. You can also get the status page to refresh itself every N seconds via `http://localhost/server-status?refresh=N`. This can be very useful for setup, optimization, and debugging. However, when you're not in active testing, you should disable this option to reclaim extra CPU cycles.

Other ways to improve Apache's performance include disabling logs when unnecessary, disable use of `.htaccess` via `AllowOverride none`, and eliminating unused modules. Apache Performance Notes (<http://httpd.apache.org/docs/1.3/misc/perf-tuning.html>) offers additional tips on Apache tuning. If you don't need the extensive feature set offered by Apache, you may want to consider a lightweight alternative. An example is LightTPD <<http://www.lighttpd.net/>>, whose strength is efficient handling of high traffic volumes on older systems, and which includes many features such as PHP, CGI, SSI, and URL-rewriting.

## MySQL

MySQL, as a database server, does a lot of data transfer between disk and CPU. Disk I/O will therefore be the first bottleneck that you are likely to encounter. To decrease disk I/O, the various internal buffers of MySQL use main memory as a cache for data that is on disk. MySQL has global buffers in addition to per-thread buffers. The general rule of thumb is that the main memory available to MySQL should be big enough to handle MySQL's global buffers plus per-thread buffers multiplied by the maximum number of concurrent connections being created. By properly adjusting the amount of memory that

MySQL allocates to each of these buffers, you will gain significant performance improvements.

Here are some key parameters in `my.cnf` that can be used to decrease disk I/O:

### Global parameters

- **key\_buffer\_size** - Key buffer is a global buffer that stores MyISAM (the default storage engine) indexes. Every time a block of index values is referenced, it will be loaded into the key buffer. In order to scan a table's index faster, a query reads the relevant indexes from the buffer rather than the disk. Unfortunately, when the buffer is full, some values stored in the buffer must be discarded to make room for new values. It is recommended to set this value between 20% and 50% of the total memory on a dedicated server, or the total size of `.MYI` files (index files) on a shared server. If you don't have that much memory dedicated to key buffer, you can tune this setting by comparing the `Key_reads` (number of requests read from disk), and the `Key_read_requests` (number of requests for a index block) status variables. The ratio of `Key_reads` to `Key_read_requests` should be less than 1% or 1 `Key_reads` for every 100 or more `Key_read_requests`. Use the `show status like '%key_read%`' command to reveal these two values, and use the `show variables like '%key_buffer%`' command to find out the key buffer size. Note that the key buffer is only for MyISAM tables. Other table types have different parameters for tuning (e.g. `innodb_buffer_pool_size` for InnoDB tables).
- **table\_cache** - Limits the maximum number of tables that can be opened at once. With MyISAM tables, each table and index represents a separate file. Because opening and closing files is relatively slow, MySQL puts tables in cache until they are explicitly closed, or the total number of open tables exceeds the `table_cache` parameter. Increasing the value of `table_cache` will be helpful if you have a large number of tables on your server. To determine whether the `table_cache` value needs to be increased, type the following at a mysql prompt:

```
show variables like 'table_cache';
show status like 'open_tables';
```

If the value of `open_tables` is significantly bigger than the value of `table_cache`, then you should increase the value of `table_cache`.

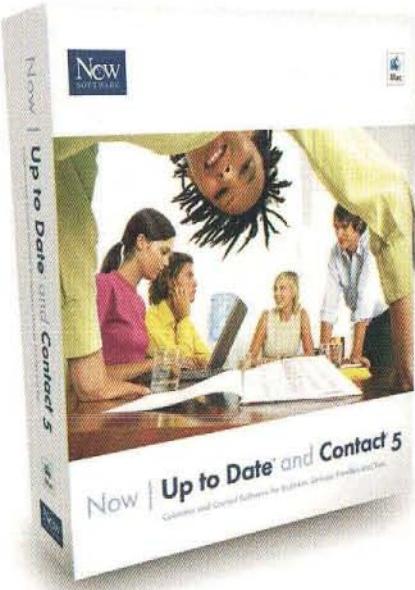
- **max\_connections** - Controls the maximum number of simultaneous client connections. The default value is 100. If your server is very busy, or if the value of the `Threads_connected` status variable approximates to the value of `max_connections`, you should increase the value of the latter to allow for more connections.

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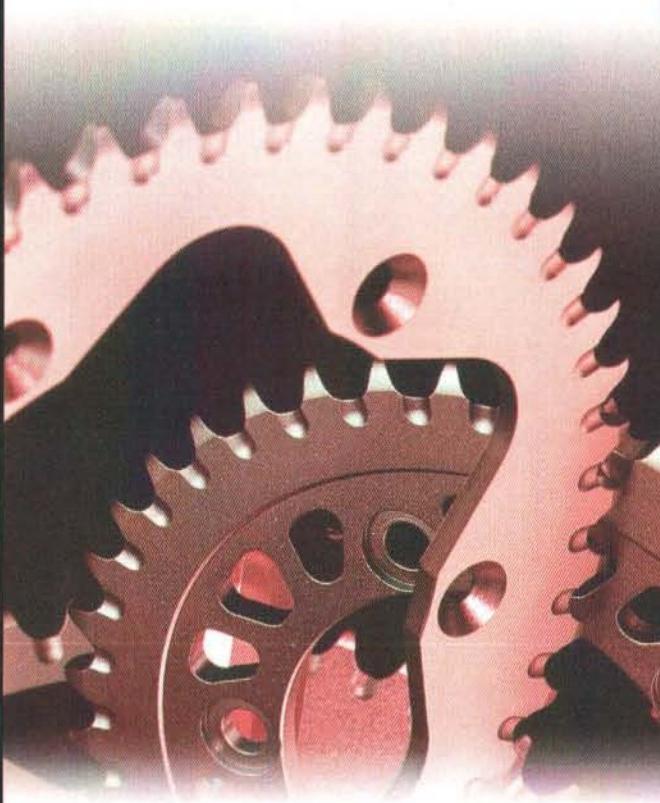


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## Per-Client Buffers

Exercise caution when increasing the value of per-client variables as these buffers are allocated on a per connection basis. The value of these buffers should not be too high; otherwise, the performance of MySQL or other processes may suffer due to exorbitant memory consumption.

- `read_buffer_size` - Specifies the size of the buffer that is used when a full table scan is performed to store the table data.
- `read_rnd_buffer_size` - Determines the size of the buffer that is used in reading records after an intermediate sort.
- `sort_buffer_size` - Determines the size of the buffer that is used during read and sort operations.
- `join_buffer_size` - Determines the size of the buffer that is used to process joins.
- `max_allowed_packet` - The maximum size of the buffer that is used for client communication.
- `tmp_table_size` - Specifies the maximum size of temporary tables that can be stored in the memory. If the value is too small, MySQL will place the temporary table on disk. To determine the proper value for `tmp_table_size`, compare the values of `Created_tmp_tables` (number of temporary tables that are created), and `Created_tmp_disk_tables` (number of temporary tables that are placed on disk) status variables. You should increase `tmp_table_size` if the ratio of `Created_tmp_disk_tables` and `Created_tmp_tables` exceeds 2%.

## Query Cache

- `query_cache_type`, `query_cache_size` - Determines the operating mode (0 for off, 1 for on, 2 for on demand), and size parameters for query cache. The query cache keeps the results of frequently executed SELECTs in memory so that MySQL doesn't need to access the slow disk-based subsystems. This works as follows: The first time a given SELECT statement is executed, the server remembers the query and the associated results. The next time the server sees that statement, it pulls the results directly from the query cache and returns it to the user. MySQL's query cache is case-sensitive such that, each query must be identical (e.g. no extra spaces). The default value of `query_cache_size` is set to 0 and effectively disables the cache even if the value of `query_cache_type` is non-zero. To check out the performance of the query cache and its use of memory, run the following command:

```
show status like '%qcache%';
```

- `Qcache_lowmem_prunes` - Counts the number of queries that have been removed from the cache in order to free up memory for caching new queries. This can be used to help



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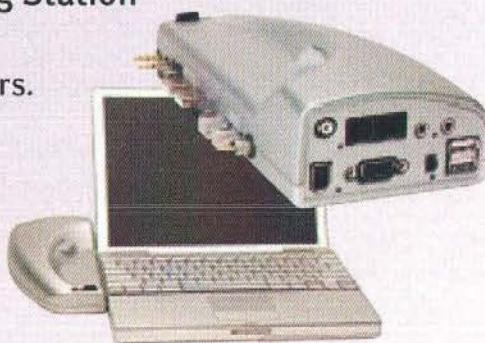
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determine query cache size. Under certain circumstances, such as when queries retrieve data from a constant table, the query cache isn't very useful and should be disabled.

For a more detailed treatment of MySQL server performance tuning consult <<http://dev.mysql.com/books/hpmysql-excerpts/ch06.html>>.

## PHP

PHP uses a two-part process for generating HTML: each time a PHP script is accessed, it is first compiled into opcode, which is then executed to generate the html. (This workflow can be seen in figure 2). This repeating process of compilation and execution, not only places significant demands on the CPU, but also increases the latency of HTTP requests, especially as scripts grow in complexity. Because it takes much longer to serve a PHP script than a static html page, we can employ various caching schemes to minimize the process of compilation and execution, and thus boost web performance.

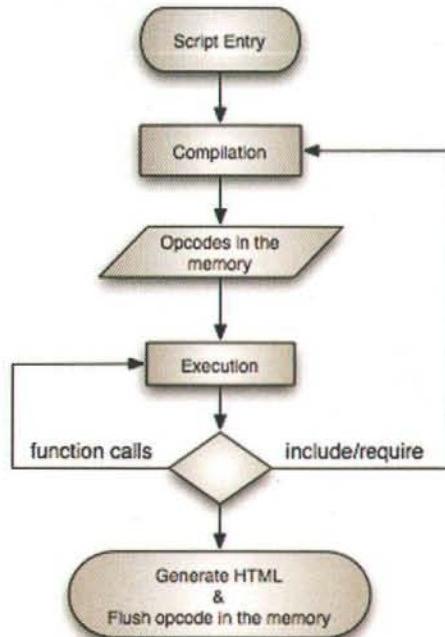
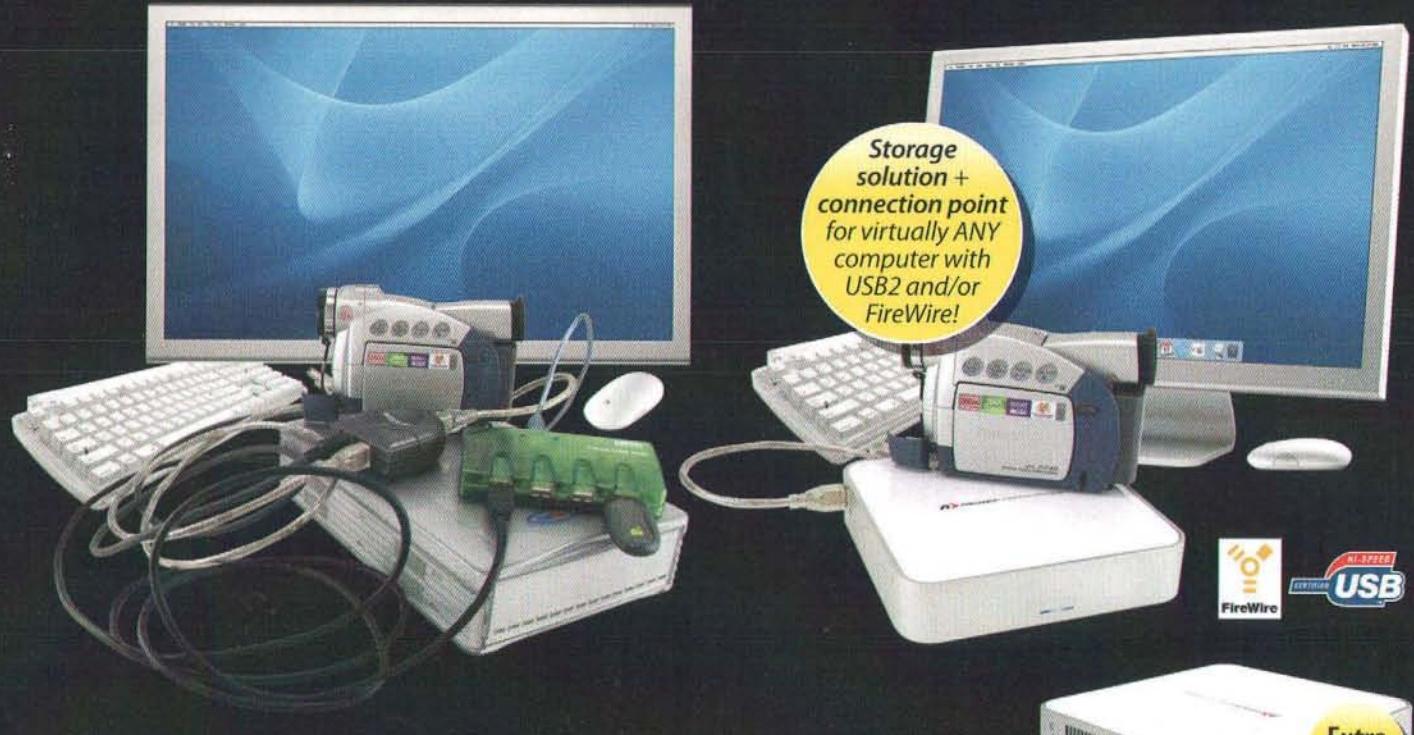


Figure 2. PHP script workflow

If your pages change infrequently, you will want to choose a caching mechanism such as Smarty or Cache\_Lite to store the entire HTML output of your PHP script. Smarty (<http://smarty.php.net/>) is a robust template framework, which separates business logic (PHP code), from presentation (HTML templates). Smarty offers the ability to cache all or part of rendered HTML. For information on installation, setup and use, consult the excellent documentation on Smarty's website <<http://smarty.php.net/manual/en/>>. Because Smarty requires you to restructure your PHP codes, a simpler alternative is Cache\_Lite. Cache\_Lite provides a solid, easy-to-implement library for solving cache-related issues. It is easy to install via the PEAR

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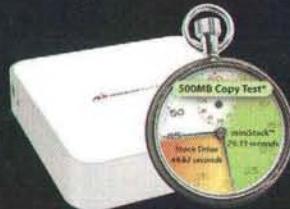
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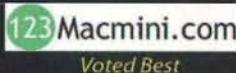
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(PHP Extension and Application Repository) Package Manager that comes pre-installed with Mac OS X.

To install Cache\_Lite, type the following into the terminal:  
sudo pear install Cache\_Lite. Once installed, wrap the following code around your PHP scripts to enable HTML caching:

### **Listing 1: Cache\_Lite code wrapper to enable HTML caching**

```
// Include the Cache_Lite package.  
require_once ( "Cache/Lite/Output.php" );  
  
// Define options to control the behavior of  
// Cache_Lite_Output object.  
$options = array(  
    'cacheDir' => 'cache/',  
    'lifeTime' => 3600, // expire after 1 hour  
    'pearErrorMode' => CACHE_LITE_ERROR_DIE  
);  
  
// Instantiate Cache_Lite_Output object  
$cache = new Cache_Lite_Output($options);  
  
// Test if the cached file exists.  
// If so, use the cached file.  
// Otherwise, compile and execute the PHP codes and rendered a  
// cache file with the ID specified below.  
if ( !( $cache -> start ( "index". $q_string ) ) ) {  
  
    /* *** YOUR PHP CODE HERE *** */  
  
    // the end of Cache_Lite_Output object  
    $cache -> end();  
}
```

You can now run ApacheBench with and without Cache\_Lite in order to measure the performance improvement. In this example, I chose to set the number of requests to 1000 (-n 1000), and the number of simultaneous connections to 10 (-c 10). The performance with and without Cache\_Lite enabled is seen in figures 3 and 4, respectively.

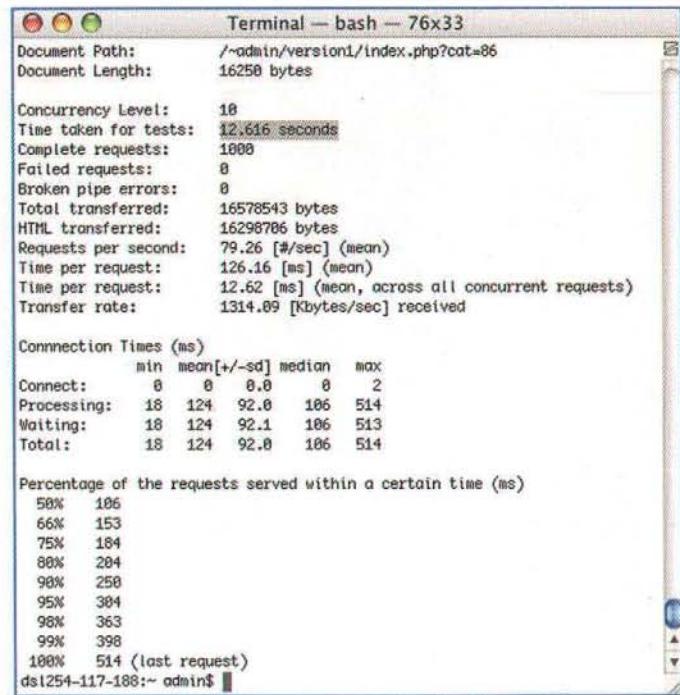
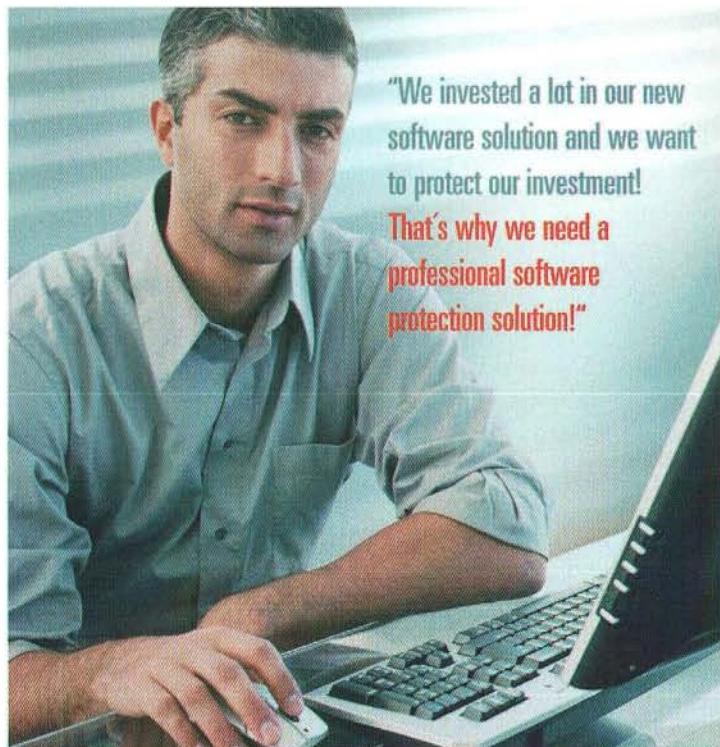


Figure 3. ab results for the script with Cache\_Lite enabled



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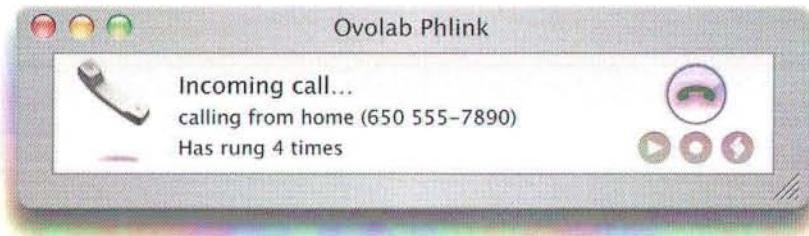
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```

Terminal — bash — 76x33
Document Path: /~admin/version1/index_no_cache.php?cat=86
Document Length: 16250 bytes

Concurrency Level: 10
Time taken for tests: 76.961 seconds
Complete requests: 1000
Failed requests: 0
Broken pipe errors: 0
Total transferred: 16529000 bytes
HTML transferred: 16250000 bytes
Requests per second: 12.99 [/sec] (mean)
Time per request: 769.61 [ms] (mean)
Time per request: 76.96 [ms] (mean, across all concurrent requests)
Transfer rate: 214.77 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:      0    0.0    0.0     0       2
Processing:  250   766   65.3   761  1879
Waiting:     249   766   65.3   761  1879
Total:       250   766   65.3   761  1879

Percentage of the requests served within a certain time (ms)
  50%   761
  66%   781
  75%   794
  80%   801
  90%   838
  95%   868
  98%   919
  99%   971
 100%  1879 (last request)
dstat254-117-188:~ admin$ 

```

**Figure 4.** ab results for the same script without Cache\_Lite

As you can see from the two terminal outputs, it took about 12 seconds to serve 1000 requests using 10

simultaneous connections for the script with Cache\_Lite enabled, versus 77 seconds for the same script without Cache\_Lite. Therefore, the script with the caching system can be served 6 times as fast as the one without. As the size and complexity of your scripts increase, this speed difference will be even greater.

If your page changes more frequently, such as with a stock quote, cached HTML will obviously not be suitable. In this case, you will want to choose an opcode cache. Opcode caches keep compiled PHP scripts in memory to eliminate the need to recompile the script for each subsequent request. Well-known opcode caches include eAccelerator (<http://eaccelerator.net>), PHP Accelerator (<http://www.php-accelerator.co.uk>), Turck MMCache (<http://turck-mmcache.sourceforge.net>), and Alternative PHP Cache (<http://pecl.php.net/package/APC>). If you do not wish to go through the trouble to set up opcode cache, you can simply download MAMP (Macintosh, Apache, MySQL, PHP) from <http://www.mamp.info/en/home/>. This packaged solution comes with additional libraries such as eAccelerator, Zend Optimizer, and phpMyAdmin, among others.

You can further improve PHP performance via other methods, such as using output buffering. It is always good practice to ensure clean, optimized code with the aide of profiling tools such as APD and DBG.

## Conclusion

In this article we've explored several performance tuning techniques that can be applied individually or in combination to enhance the performance of AMP-based sites. By making changes to the Apache httpd.conf file, adjusting MySQL's memory use, and properly caching PHP generated HTML output, we demonstrated how to achieve significant performance improvement without purchasing additional hardware. Whether you are running a complex content management solution or hosting a personal blog, these practical guidelines will allow you to take your web applications to the next level within minutes.

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## About The Authors

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by Edward Marczak

## Easing Into dscl

*Manipulating Directory Services via the Command Line*

### Introduction

Once, centralized directories were a lofty corporate goal. Now, however, they increasingly play an important role – even with a single machine. **dscl**, the **directory services command line**, is a new, all in one way to access and manipulate directory services information. This month, we'll delve in worlds outside of the shell proper, but see how we can manipulate and interact with those other realms via command-line tools. This month will focus mainly on explaining directory service concepts.

### Directory Services

To explain **dscl**, I also need to explain directory services. The term itself has no specific technical definition – kind of like “web services” or “web 2-point-oh.” You know them when you see them, however, two web 2.0 sites can use different technology altogether. Directory services is a *concept*. The concept is that all directory information should have one interface for access. Different applications should be able to access this information for a variety of purposes. This information may be purely centralized, distributed or replicated. NeXT Computers developed a directory service called NetInfo. OS X inherited this directory service for its initial releases. NetInfo was good in its day, but Apple knew a system with more flexibility was needed. Enter OpenDirectory, Apple's current directory service. Like other directory services, such as Novell's eDir, Sun's yp/NIS or Microsoft's ActiveDirectory, OpenDirectory is a modern directory implementation with an LDAP interface. Unlike the other two mentioned, Apple's system is completely standards-based and easily manipulated.

### LDAP

LDAP, the Lightweight Directory Access Protocol, surfaced in 1992. It's “lightweight” only in relation to X.500, the Directory Access Protocol. Somewhat like light beer – it needs to be compared to something else to be considered ‘lightweight’. It is a protocol, and nothing more. It is not a database in and of itself. It may provide access to one, but doesn't *have* to. All it *must* do is accept requests and answer them – whether that answer comes from a database or not is of no concern. LDAP categorizes its information in a hierarchical tree structure. Following most digital trees, the root is visualized at the top, or on the side. Each branch is a container, and each leaf is a record. This is the Directory Information Tree, or, DIT. It's easiest if we visualize this. Figure 1 shows a basic LDAP hierarchy.

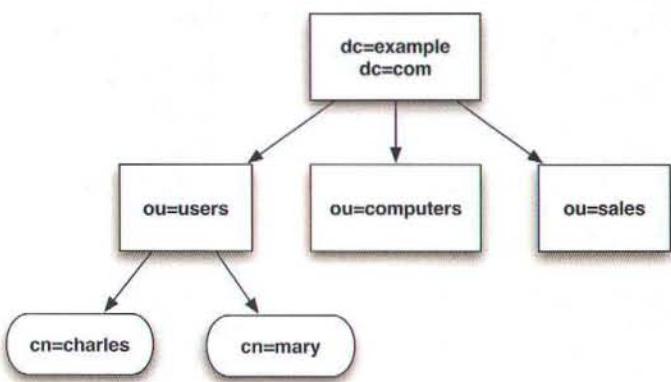


Figure 1: A sample (and very basic) Directory Information Tree.

LDAP uses some very specific terminology to designate container and leaf types. One similarity to a relational database is that they are both strongly-typed and use structured information. A *distinguished name*, or “DN”, represents a unique identifier for a record. The top of the tree is called the *base DN*. This is typically defined as an “O” (*Organization*), or a series of DC records (*Domain Components*). “OU” stands for *organizational unit*. This is a container that allows you to organize other types.

### OpenDirectory

Now that we're through the world's briefest introduction to LDAP, let's take a look at Apple's OpenDirectory. OpenDirectory is incredibly interesting because unlike ActiveDirectory and eDir, which are basically ‘one thing’, OpenDirectory is many things. On its own, it stores information in a BDB database via LDAP. Additionally, it ships with several plug-ins that allow it to access other directory systems such as ActiveDirectory. Finally, you can map OpenDirectory records into attributes provided by other systems that expose their directory through LDAP. What this all means is that when you

use a directory tool on OS X to query information from the service, you may not be 100% sure where that data originated, be it native to OpenDirectory, or, pulled from another system over a network.

Some of the early impetus for directory services was simply to have a single place to perform lookups for basic employee information, such as phone numbers, e-mail addresses, etc. This is precisely one of the functions that OpenDirectory provides (easily in Tiger, you have to jump through some hoops in Panther).

## A Case for the Shell

As is slightly typical, I feel I have to convince people that there are cases where command-line tools beat out a GUI. Of course, there are GUI tools, such as Workgroup Manager, that manipulate directory information. In many cases, these are the right tools. However, using the shell clearly trumps the GUI in these cases:

- Automated importing/exporting many users in/out of a directory service.
- Watching log files *while* you're in the GUI console. Server Admin's stateless HTTP log polling just doesn't cut it.
- Troubleshooting while someone else works at the GUI console. I've used this to great effect. Sometimes, a machine is having an issue that make is a little off-kilter, but work can still be accomplished. Fine. Let the end-user get some work done. You can be getting work done on that machine, too, via ssh.

I don't think I've really found anyone, though, who, once shown how the shell can benefit them, thinks that it's a bad idea.

## What's all this dscl then?

Onto the real topic of this article! While OS X Server started off with NetInfo as its "native" directory service, OS X still uses a NetInfo database to store all local account information. Despite this, OS X's directory services *framework* with its ability to use plug-ins opens an API to accessing any directory service set up through the Directory Access application (located in your Utilities folder). The long-standing niutil (NetInfo utility) program, which can only read and write into NetInfo, has been superseded by dscl, which can read and write through the directory services API – in other words, it can read and write into any directory service configured through Directory Access (authorization permitting).

Interestingly, dscl itself provides an interactive shell (with basic tab-completion, too!). Let's get our feet wet there. Open up a shell on the machine you'd like to be working on. This means that you may want to ssh somewhere if you need to. At the prompt, type `dscl`:

```
Jack-Kerouak:~ marczak$ dscl
dscl (v20.4)
usage: dscl [options] [<datasource> [<command>]]
datasource:
  localhost      (default)          or
  <hostname>    (requires DS proxy support, >= OS-158)  or
  <nodename>    (Directory Service style node name)   or
  <domainname>  (NetInfo style domain name)
options:
  -u <user>      authenticate as user (required when using DS Proxy)
```

Figure 2: `dscl` with no arguments defaults to a `dscl-shell`

Although it's not shown in figure 2, you should note the last line of this output: "Entering interactive mode...", where you are dumped at a prompt. Typing `ls` lists the subdirectories or objects of the current path:

```
> ls
AppleTalk
Bonjour
LDAPv3
NetInfo
SLP
SMB

Search
Contact
```

Fig 3: `dscl` directory listing

Since we *all* have a NetInfo directory, I'll start there. Using `cd`, you can change into the NetInfo directory (`cd NetInfo`). Doing so will change the prompt to show that you're now out of the root directory and into a subdirectory. Again, typing `ls` will help you get your bearings. If you've ever used NetInfo Manager, this should look familiar:

```
/NetInfo/root > ls
AFPUserAliases
Aliases
Config
Groups
Machines
Networks
NFS
Printers
Protocols
RPC
Services
Users
```

Figure 4: Displaying the local NetInfo root

From this point, change into the `Users` directory (`cd Users`), `ls` if you'd like to get a list of users stored in NetInfo, and then change into the user of your choice (`cd username`). If you're rushing ahead, and type `ls`, you may be surprised. You don't "list" properties, you read them. So type `read`, and press return. This will list all attributes for the account in question.

```

AppleMetaNodeLocation: /NetInfo/root
AuthenticationAuthority: ;ShadowHash;
AuthenticationHint:
GeneratedUID: BCC15C9C-7FCB-455D-B942-5557CED8AC48
NFSHomeDirectory: /Users/marczak
Password: *****
Picture: /Library/Caches/com.apple.user501pictureCache.userImage
PrimaryGroupID: 501
RealName: Edward R. Marczak
RecordName: marczak
RecordType: dsRecTypeStandard:Users
UniqueID: 501
UserShell: /bin/bash

```

**Figure 5: Reading a NetInfo user account.**

You can repeat this exercise for the LDAPv3 branch of the tree, if you're fortunate enough to be connected to an LDAP/OD store. Type quit, and you'll leave dscl, and be returned to your Unix shell. Let's see how to drive dscl outside of its interactive shell.

To read the same user information directly, we can use dscl thusly:

```
dscl localhost -read /NetInfo/root/Users/marczak
```

If you just want to pick out certain keys you can supply them after the path:

```
$ dscl localhost -read /NetInfo/root/Users/marczak UniqueID
RealName
UniqueID: 501
RealName: Edward R. Marczak
```

Keeping in mind that we're *easing* into dscl, I'll save some of the more in-depth information for future months. However, there's still plenty more to note.

We've been using dscl to look at a NetInfo store on the local host. We can also specify an LDAP store. To get the same information from the LDAv3 node, you need to specify LDAP as the datasource:

```
dscl /LDAPv3/lycaeum.radiotope.com -read /Users/marczak
```

If you're running this from a server, as you often may if you have an automated script, you can also use the localhost designation of 127.0.0.1 in place of the node name.

Some operations require authentication, so you'll need to supply that information, too:

```
dscl -u [directory admin] -P [password] /LDAPv3/127.0.0.1 -
delete /Users/marczak
```

For the security conscious among you, and that's hopefully everyone, instead of using the "-P" switch and specifying the password on the command-line, you can instead use "-p" to have dscl prompt you for the password. Naturally, certain situations call for certain behavior. You can't automate a nightly routine and have the operation halt, waiting for a password. Those scripts need to be protected appropriately.

One underappreciated mode of dscl is "authonly". Says what it does, does what it says: tests authentication of a username/password combination. Watch it in action:

```
lycaeum:~ root# dscl /LDAPv3/127.0.0.1 authonly marczak asdf
Authentication for node /LDAPv3/127.0.0.1 failed. (-14090,
eDSAAuthFailed)
lycaeum:~ root# dscl /LDAPv3/127.0.0.1 authonly marczak
myrealpass
lycaeum:~ root#
```

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In grand Unix fashion, no news is good news. On the first line, I supply a known-bad password, and get back the appropriate error, authorization failed. On the next line I give the right credentials, and get back...nothing. (Technically, you get a "0" error code, anyone remember where that was covered? echo \$?).

Combine dscl with traditional bash scripting and you can automate routines, and do things that can't be done in Workgroup Manager at all! How about a report of all users, listing their full name, short name and home directory?

```
#!/bin/bash

for i in `dscl /LDAPv3/127.0.0.1 -list /Users` ; do
    dscl /LDAPv3/127.0.0.1 -read /Users/${i} RealName uid
    homeDirectory | awk 'BEGIN {FS=":"}' {print $2}'
    echo
done
```

Making the file executable and running it produces (partially):

```
# ./userrep.sh
Directory Administrator
diradmin
/Users/diradmin

Dorothy Marczak
dorothy
/Network/Servers/lycaeum.radiotope.com/Users/dorothy

Edward R. Marczak
marczak
/Network/Servers/lycaeum.radiotope.com/Volumes/Data2/Users/marczak
```

## Conclusion

dscl is a powerful, and handy, tool as it will report on and manipulate the information in any accessible Directory Service

store. As with many command line utilities, its real power comes when automated as part of a larger script. Data are only useful if they can be used, accessed and reported upon. Sometimes, you need to write your own tools to gather the precise information that you're looking for.

Media of the month: Guy Kawasaki's *Art of the Start*. Despite being a two year old title, it's still incredibly relevant. If you're sparked by new ideas and want to see them become reality, this is some fantastic reading. Plus, there's the gratuitous Apple tie-in.

Also, it shocks me that, having just returned from WWDC, MacWorld is nigh. Hope everyone is making their plans. For those attending, I'll see you in San Francisco! Of course, I'll see you in print next month.

## References:

Netscape Directory Project: <<http://www.mozilla.org/directory/>>  
dscl man page



## About The Author



*Ed Marczak owns and operates Radiotope, a technology consulting practice focusing on network integration, overcoming technology hurdles by*

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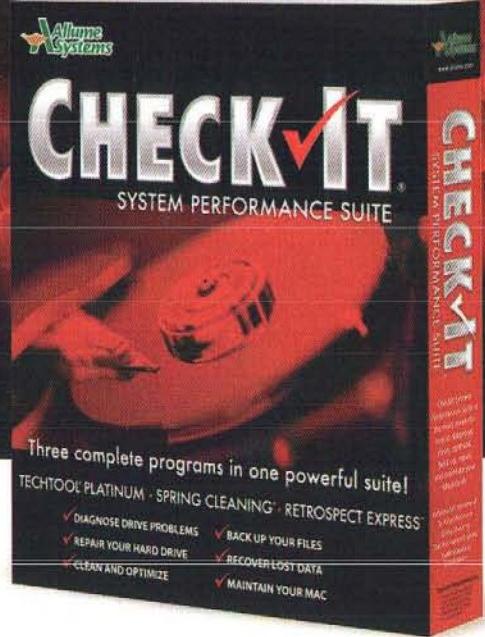
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By Philip Rinehart

## CUPS

Included with Mac OS X since the release of Jaguar, the Common Unix Printing System, CUPS, gives a system administrator great flexibility and power. Many Unix system administrators are quite familiar with the intricacies of this system. Mac OS X takes advantage of this flexibility, while at the same time providing a very simple interface for printer management. In this article, we will delve deeper, examining the command line for use in printer management in OS X. As an added bonus, managing printers from the command line works both on Macintosh OS X and Macintosh OS X Server! Let's begin by recapping the printer interface as it appears in Tiger:

## Printer Setup Utility

The Printer Setup Utility is an evolved beast. When first introduced as Print Center in Jaguar, many options were not present. With each release of the operating system, more options have been added, allowing for greater printer control. Figure 1 shows the interface as it appears in Tiger:

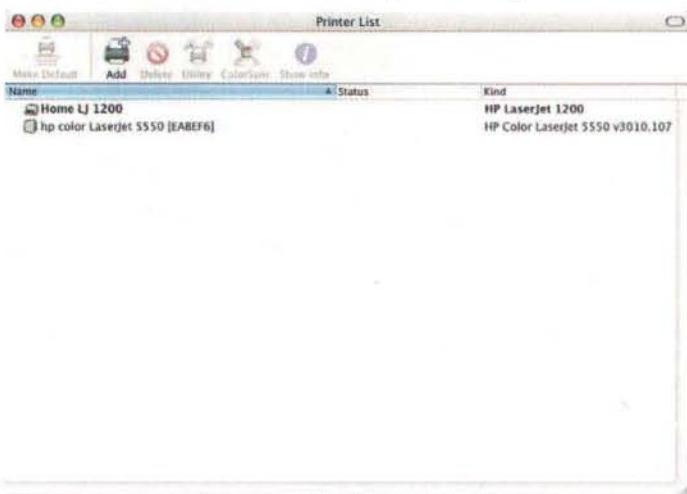


Figure 1

It appears pretty normal, eh? The obvious things are here: Adding a printer, Colorsync, Utility, and Show Info. Each item is pretty straightforward. How does this relate to CUPS though? All in due time... More interesting options now appear in the Add Printer box. By default, various types of printers are omitted from the **Add Printer** dialog. Clicking on the **More**

**Printers** button allows users to add many more types of printers, including Bluetooth, SMB (Windows), Appletalk, and other printers using TCP/IP protocols that do not use the Line Printer Daemon (LPD), or Bonjour. Prior to Tiger, adding these types of printers required using a special key combination.

Even more options are available in the Printers Menu Item. Figure 2 shows the options that are available.



Figure 2

A lot of new options have appeared in Tiger, let's now begin to see how they can tie to the command line.

## Command Line Magic

So, you ask, why would I want to use the command line instead of using the Printer Setup Utility application? What if you are attempting to administer a remote site? How about using the **Send Unix** command in Apple Remote Desktop? Removing stuck jobs from a printer? The list goes on. Often, an administrator may be able to accomplish many common tasks using their preferred administration tools, be it ssh, ARD, or some other way of delivering custom user settings. Using Figure 2 as a point of reference, each option can be accomplished with the command line. For simplicities sake, all the command line options below assume that at least one printer has been added to the system with the Printer Setup Utility.

### Setting the Default Printer

The first option, **Make Default** is relatively simply accomplished using either `lpoptions` or `lpadmin`. In this



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case, lpdadmin makes more sense, as it will be the basis for many of the other command line tasks in this article. Here's the command:

```
lpadmin -d printer_name
```

Simple. Well, not quite. The command is fairly simple, getting the printer name is not. The queue name is typically what is needed to properly invoke this command. If the machine is being remotely administered, the queue names for all attached printers can be obtained with the lpstat command. Get ready, this command is a little long:

```
lpstat -v | awk '{sub(/:/:,"",\$3); print \$3}'
```

You might ask, why all the extra stuff with awk? In this case, it is simply a matter of convenience, as the printer names are all listed as known by the system. Typically, an IP printer name will be in a form similar to \_192\_168\_1\_108 when added using Printer Setup Utility. The last bit of trickiness is that Printer Setup Utility usually writes a file to the user's home directory that will override any setting that you send to the client machine. This file, .lpoptions, can be removed. The alternative of course is simply place a new file with this name on the client machine in the users home directory with the word **Default** before the printer name. If a global setting is what you are after, create this file in /etc/cups. Name the file here lpoptions. Always remember though, a local .lpoptions file will **always** override any global setting.

## Deleting Printers

For now, skip the Add Printer option. Moving to the delete printer menu item, it is very similar to the command for setting a default printer. Once again, the printer name is needed to delete the printer.

```
lpadmin -x _192_168_1_108
```

This command will remove the named printer from the system. Pretty simple.

## Printer Pooling

Let's get a little more complex now. Printer pooling is a new concept. Consulting the CUPS documentation, there is nothing regarding printer pooling. In the CUPS documentation, printer pools are referred to as management classes. Jobs sent to a pool (class) are sent to the first available printer. In an office with all printers in a centralized location, this option could be of some use.

```
lpadmin -p _192_168_1_108 -p hp_color_LaserJet_5550_EABEF6_-c myprinterpool
```

By now, the command should begin to look somewhat familiar. The **-p** option simply specifies the printer name that will be added to the printer pool. Each printer must be specified when creating the class. The last option is the pool name, specified with the **-c** option. Once finished, a new printer pool should appear in print center. By default the printer pool will be stopped, it can be started in the same way as a printer. Read on to find out how.

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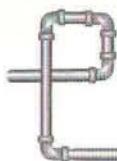
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We've looked at two of the three lynchpins for command line cups administration. The last command, `lpoptions` is used to view settings for a named printer. The command syntax is quite similar to `lpadmin`. Let's look at a command,

```
lpoptions -l -p 192_168_1_108
```

This command will return all of the available options for the printer model. It will look similar to the following output:

```
HPPaperPolicy/Fit to Page: *PromptUser NearestSizeAdjust  
NearestSizeNoAdjust  
InstalledMemory/Total Printer Memory: *8MB 16MB 24MB 32MB 48MB  
64MB  
HPwmSwitch/Watermark/Overlay: *Off Watermark Overlay  
HPwmPages/Watermark Pages: *AllPages FirstPage  
HPwmTextMessage/Watermark Text: *Draft CompanyConfidential  
CompanyProprietary CompanyPrivate Confidential Copy Copyright  
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DoublePostcard w558h774 Env10 EnvMonarch EnvDL EnvC5 EnvISOBS  
InputSlot/Media Source: *Upper  
ManualFeed/Tray 1 (Manual): True *False  
HPhalftone/Levels of Gray: *PrinterDefault Enhanced Standard  
Resolution/Printer Resolution: 1200x1200dpi *600x600x2dpi  
600x600dpi 300x300dpi  
HPEconoMode/EconoMode: *PrinterDefault True False
```

These options are usually directly from the PPD file for the printer. Choosing a specific option from the above list, the resolution of the printer can be set with `lpadmin` using this command:

```
lpadmin -p _192_168_1_108 -o Resolution=1200x1200dpi
```

Unfortunately, many of these options are not exposed in the Printer Setup Utility. Additionally, the **most** useful tool, page size, cannot be set from the command line, as a Preference plist is actually used by the OS X printing system.

### One liners

A lot of the remaining menu options can be accomplished with a single line command. Stopping jobs requires one line `disable printername`. Restarting the queue is just as easy, instead of `disable printername` use `enable printername`. Once you open the Printer Setup Utility using either command, the state of the print queue will be stopped or started based on the command entered. Earlier, printer pools were discussed. Here's how you enable the printer pool, use the command above, and substitute the pool name for the printername. Once you have enabled the queue or pool, it needs to be configured to accept or reject print jobs. The command is identical in syntax to enabling or disabling, use



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accept/reject printername to allow the printer to accept or reject jobs.

Getting information about a printer using the command line is also a one liner, though it does not present the information in quite the way that the Printer Setup Utility does. Type the following command, `lpstat -t` and a complete list of printer statuses, the default destination, and the scheduler is shown.

## Going Deeper With lpadmin

If you will, the gateway to the CUPS printing system is the single command `lpadmin`. Until now, I've compared how it can be used with the Menu options in Printer Setup Utility, drawing corollaries as appropriate. However, we have not examined it extensively. Adding printers is probably the single largest headache for a system administrator. With `lpadmin`, much of this barrier can be overcome without using a Desktop Management solution.

### Adding a printer from the command line

Adding a printer from the command line is probably the single most powerful use of `lpadmin`. If you wanted to add a printer to a group of computers with Apple Remote Desktop, `lpadmin` is a very quick and easy way to do so. Here's the basic command to do so:

```
lpadmin -p myprinter -E -v lpd://10.0.1.0/queue -m  
laserjet.ppd
```

Most of this command should look quite familiar. `-p` specifies the printer name. In this case though, the printer name can be any name that is descriptive. Unlike the Printer Setup Utility, the printername added with `lpadmin` does not have to have a form similar to `192_168_1_108`. In the Printer Setup Utility, this field is the Printer Name, located in the Name & Location tab. Next we enable the printer with the `-E` option. It is very important that this option is entered **after** the printer option. If it is specified before, `lpadmin` will attempt to connect to the CUPS using encryption. Continuing, the **most** important option is `-v`. Why? `-v` provides the Uniform Resource Identifier (URI) for the printer. In the above example, `lpd` is being used as the printer communication protocol. Here is a list of the most common device URI's:

```
direct pdf700://distiller  
direct pdf700  
network pap  
network socket  
direct bluetooth  
serial fax://dev/cu.Bluetooth-Modem  
network epsonpap  
direct epsonfirewire  
network epsontcpip  
serial fax  
direct firewire  
network http  
network ipp  
network lpd  
direct usb  
network smb  
network mdns
```

Determining the device URI is one of the trickiest parts of adding a printer from the command line. If unsure of the device URI, add a test printer with the protocol desired. Once finished, use `lpstat -t` to determine the proper form. The last option `-m` specifies the ppd file that should be used for the printer. If none is specified, the printer will use the raw driver. The raw driver is problematic, usually causing print jobs to fail.

The model option needs closer inspection though, as it is not immediately obvious what types of printer models are supported. `-m` uses only models in the `/usr/share/cups/model` directory. It can also use any ppd file at any location on the file system as long as it is a file in ppd format. If the file is not in `/usr/share/cups/model`, specify the full path with this option. But wait, there's more! Mac OS X stores a whole slew of drivers in gzipped format. Try adding a ppd file stored in this way. What happens? An error is thrown by `lpadmin`, but the printer is still added! Look at the driver though, it is a **RAW** driver. Not good. Fortunately, CUPS has provided a way around this, the `-P` option. With this option, any gzipped file can be used. Here's an example command:

```
lpadmin -p printername -E -v lpd://10.0.1.0 -P  
/Library/Printers/PPDs/Contents/Resources/en.lproj/Dell\ Laser\  
Printer\ 3100cn.gz
```

As most of the printer ppd files are gzipped in Tiger, this command is probably the most useful. A couple of other

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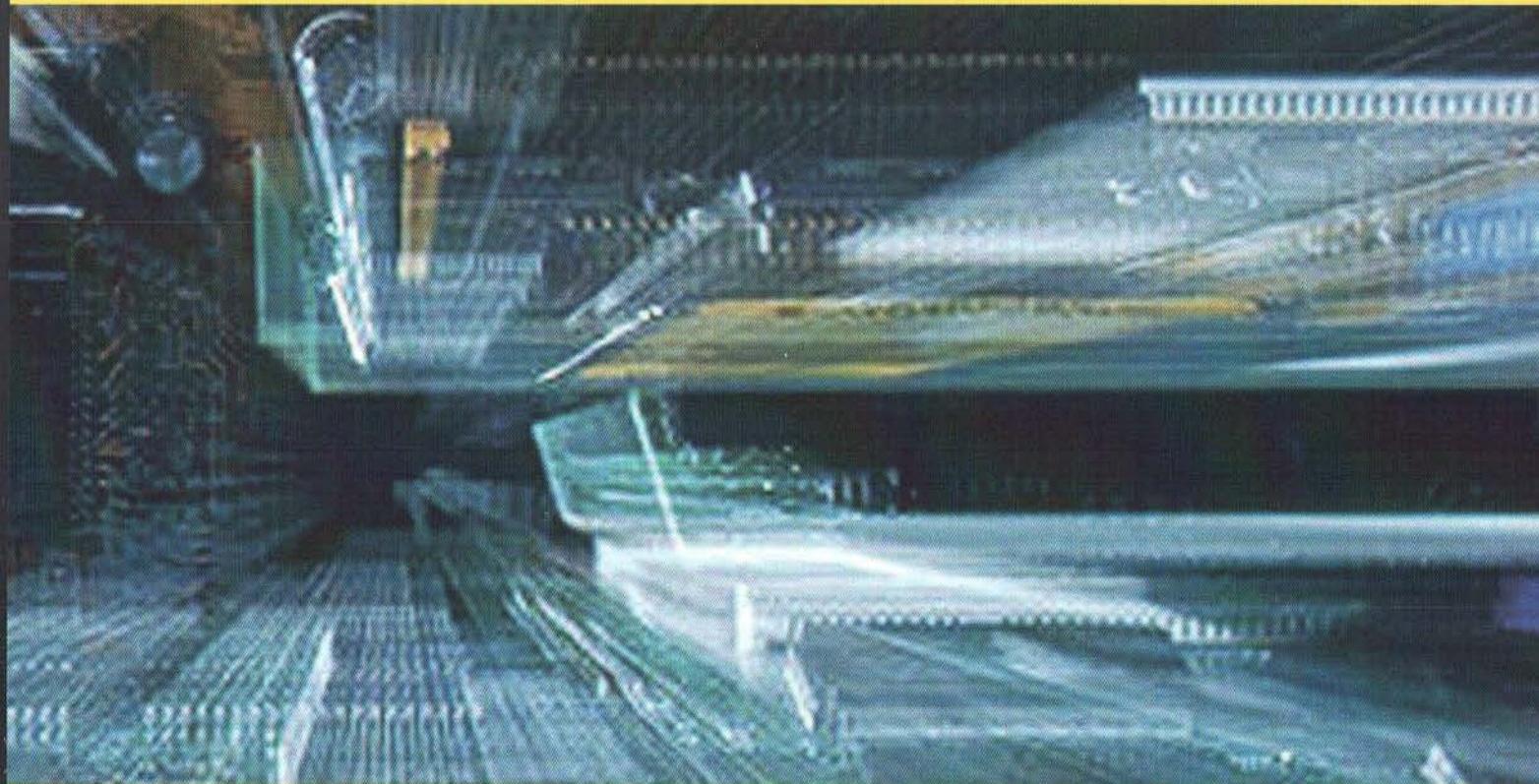
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command line options can be used to provide a location and custom description. The switches are **-D** for description, and **-L** for location. They are not required, but are useful for informational purposes on a client machine.

## Advanced options

What is the next step? Adding a printer from the command line is nice, but lpadmin has a number of advanced options that benefit a system administrator.

The first option is specifying a quota for the printer. There are three types of quotas, kilobyte, page-limit, and period. The syntax for all three commands is identical,

```
lpadmin -p printername -o job-k-limit=1024
```

The three quota options can be used individually or in combination. The job-k-limit option sets a limit per kilobyte, job-page-limit restricts the number of pages that can be printed, and job-quota-period sets the time interval for quota usage. Note that the job-quota-period time interval is expressed in seconds. To enforce quotas for a single day, specify job-quota-period=86400. Quotas are applied for each individual user, but apply to every user of that printer. As an example, if the quota is set to 25 pages, every user will be able to print 25 pages on the printer. Users cannot be excluded on an individual basis from quota enforcement.

One other slight change is needed to enforce quotas on print queues. Using an editor, open the cupsd.conf file located in /etc/cups. Search for AppleQuotas. The line should be commented out, uncomment it and restart the cups daemon.

Unfortunately, the OS X interface does not indicate why printing failed, either presenting no dialogue or simply stating that an error in printing has happened.

In addition to quotas, users and groups can be allowed or denied access to a printer. By now, the command to do this should look achingly familiar. Once again:

```
lpadmin -p printername -u deny:username,@groupname
```

This directive sets access controls to print queues on an allow/deny basis per user. Group name restrictions use the @ symbol before the group name. Again, no meaningful feedback is provided by the OS X interface. One last piece of information: only local users on the machine can be denied access, currently it does not work if the machine is bound to a Directory Services system.

That finally finishes all of the various options that can be controlled using command line tools. With knowledge of all the various options, there are a number of interesting things that can be accomplished using scripts.

## Making it useful

To make using the command line really useful, how about a real world problem? A client machine has been bound to a Directory Service. Multiple network users are attempting to print, but the queue is stopping for some unknown reason. In this case, a system administrator can use a single command to inspect the status of any printer. Use lprm to determine if jobs are printing, and how many entries are in the queue. Assume that the queue has a stuck job. To remove the stuck job, send the command cancel jobid. It does the trick



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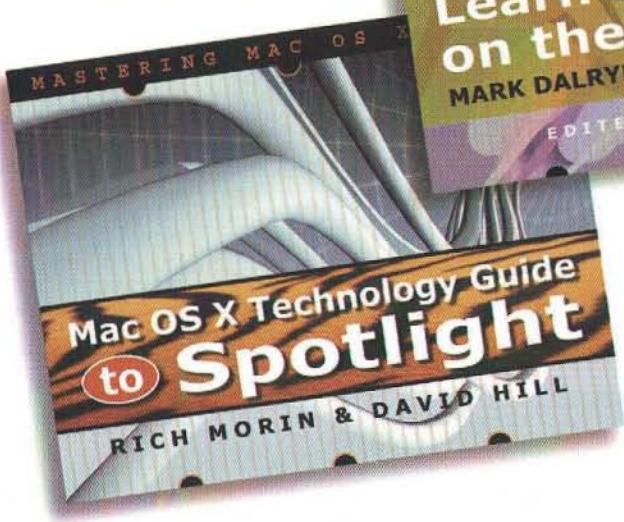
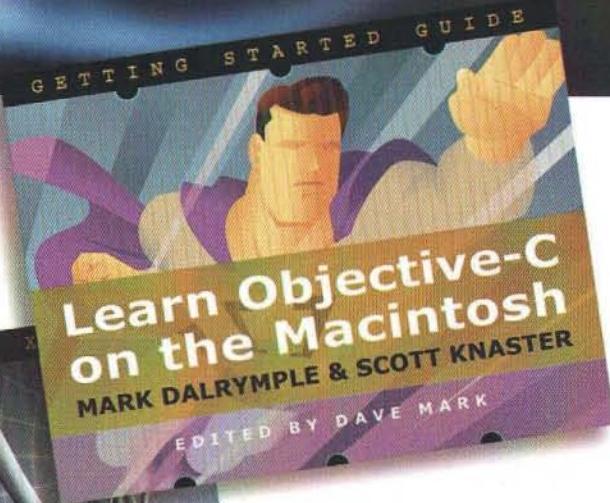
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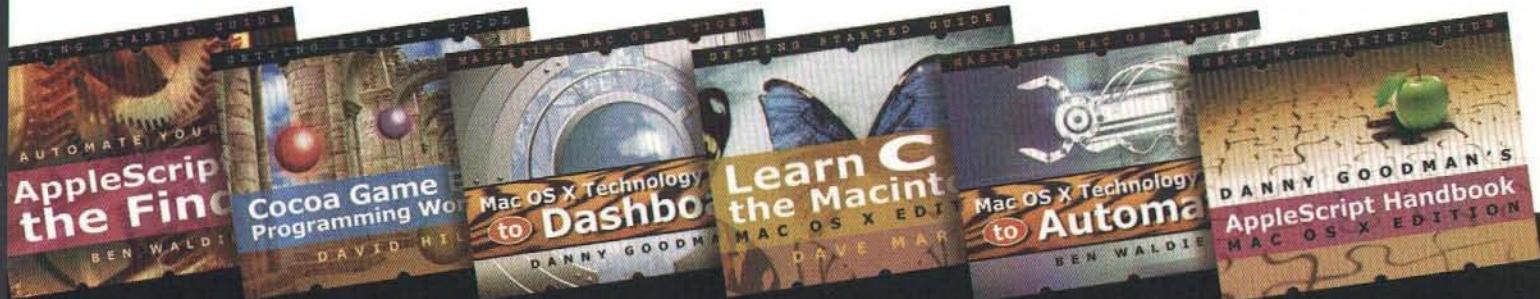


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quite nicely. If the job id is unknown, add -1 for a complete listing of all jobs.

Pretty quick and dirty, and it solves the immediate problem. However, what if the queue has been stuck for some time? The printer will immediately begin to process all jobs, often resulting in unnecessary and extraneous print jobs. Extending the concept, create a logout script. Here's an example script:

```
#!/usr/bin/perl -wi  
  
for (`lpstat -a`) {  
    s/\s.*\n//;  
    `cancel -a $_`;  
}
```

This really short script takes advantage of the CUPS command line. Walking through it, all printers on the machine are listed, the trailing return is removed, and all jobs are cancelled on all available printers. No more stuck print jobs once a user logs out!

With a knowledge of the command line, the sky is the limit. Almost any printer problem can be administered remotely, using your favorite remote administration tool.

## Odds and ends

One of the problems with adding a printer from the command line is some functionality is lost. In particular, ColorSync profiles are not associated with the printer when adding from the command line. With a little perl magic, a CUPS

keyword can be added to the printer ppd file that lives in /etc/cups/ppd. Without further delay:

```
perl -pi -e 's/*APP/*cupsICCPProfile\  
\\Library\\Printers\\Dell\\Profiles\\Dell\\ Laser\\ Printer\\  
3100cn.icc\\n*APP/' /etc/cups/ppd/myprinter.ppd
```

This one liner inserts a ColorSync keyword into the printer ppd file. Once added, the printer has a ColorSync profile associated with it.

Occasionally the debugging information shown in the system log file is not sufficient. To crank up the logging information, edit the cupsd.conf file. It is initially set to provide info level logging. For most purposes that is sufficient. If not, debug and debug2 can be set in the cupsd.conf file. One warning though, the amount of information can be staggering when set to debug2 level logging.

One option that has been the bane of many system administrators existence is the use of binary printing from Photoshop. Occasionally users will print a file in binary form to a printer, spewing pages and pages of one character per page. A printer can now be set from the command line to understand binary printing options. Our good friend, lpadmin to the rescue!

```
lpadmin -p printername -o protocol=TBCP
```

The printer will now correctly send binary printing jobs. Woohoo!

The last fun thing that can be done is accessing the cups interface from the local web interface. Open a web browser, and enter <http://localhost:631>. Most of the functionality in this article is available through the web interface. Most often, I use it for browsing the CUPS documentation without having to access the [cups.org](http://cups.org) website.

## Armed and dangerous

Almost any task that can be accomplished using Printer Setup Utility can also be done with the command line. Only one item in Printer Setup cannot be accomplished easily, adding a Desktop Printer. It probably makes sense that this is the case, as desktop printers are a very Mac like functionality. Delving into it a little deeper, Printer Setup Utility also creates a printer "app" in /Library/Printers. Ipadmin does not create this .app file. If Desktop Printers are very important in your environment, the command line may not be for you. Now get out there, and start strutting your new stuff!

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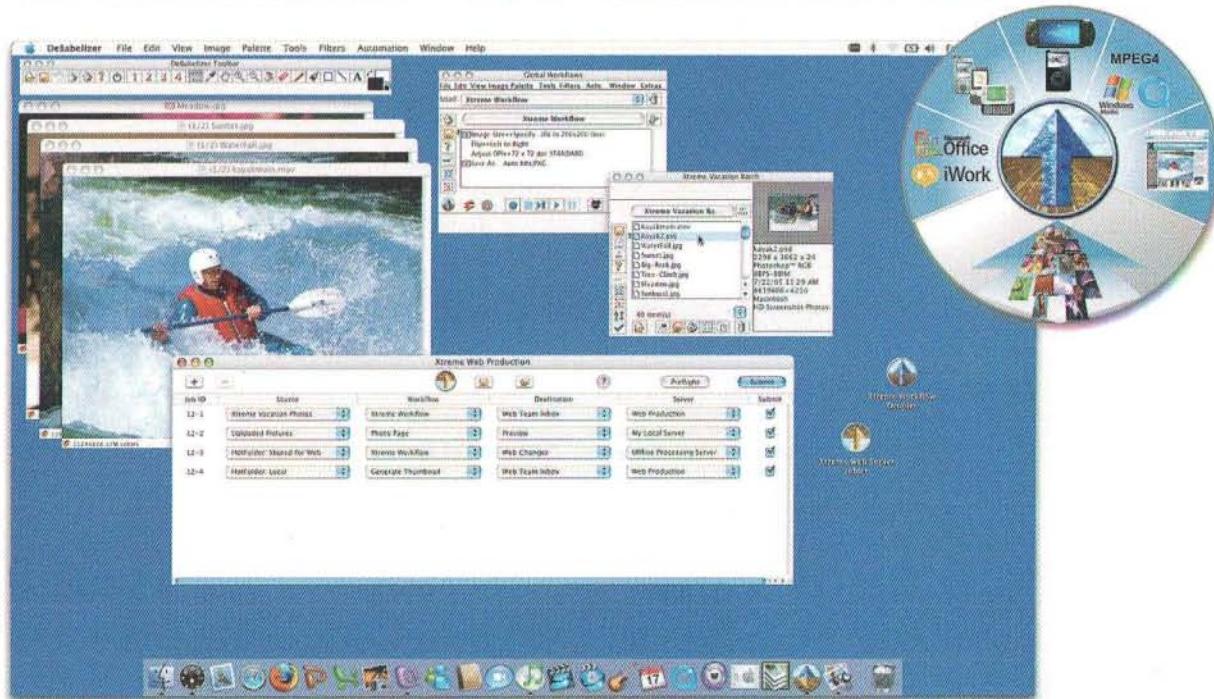
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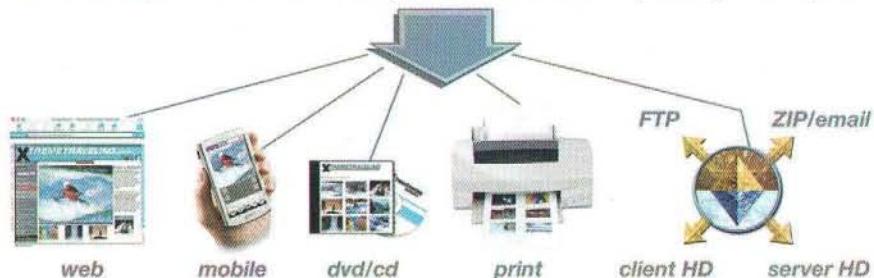
## About The Author

**Philip Rinehart** is co-chair of the steering committee leading the Mac OS X Enterprise Project ([macenterprise.org](http://macenterprise.org)) and is the Lead Mac Analyst at Yale University. He has been using Macintosh Computers since the days of the Macintosh SE, and Mac OS X since its Developer Preview Release. Before coming to Yale, he worked as a Unix system administrator for a dot-com company. He can be reached at: [philip.rinehart@yale.edu](mailto:philip.rinehart@yale.edu).

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# Ajax on Rails

*Developing Web 2.0 applications  
with the Rails framework*

BY RICH WARREN

## Introduction

In my last article, we built a simple ToDo web application, HoneyDo. This time, we will add fancy new Ajax features. You've heard of Ajax, right? It is the eye of the Web 2.0 buzz-hurricane. Ajax uses JavaScript to dynamically update small portions of a page. This lets you build responsive, interactive web pages. Ajax applications often feel like desktop apps. They respond quickly to user actions, since they do not need to download a completely new page every time you click on a link. Andrew Turner wrote an excellent article, "Adding Ajax To A Website", in the January 2006 issue of MacTech. Please check out that article for an overview of this technology.

Writing an Ajax application often means splitting your content-generation code into two parts. A typical setup might use PHP to communicate with the database and build the initial page, then use JavaScript for live changes. A single file may contain three different languages: standard HTML, PHP, and JavaScript—as well as references to additional files and libraries. As applications become more complex, these parts tend to get muddled. JavaScript calls PHP files, PHP scripts dynamically build JavaScript functions, and everything is embedded in the static HTML.

Rails (and other, similarly-minded toolkits), lets you pull all the dynamic portions into a single language. RHTML templates still mix Ruby and HTML, but now you create 99.9% of your Ajax JavaScript using simple Rails helpers. For example, in this tutorial, we won't write a single line of JavaScript. Rails keeps us safely inside the Ruby sandbox. This allows a cleaner separation between presentation (HTML), and programming (Ruby).

Rails has traditionally (if you can say "traditionally" about anything under 2 years old) had a tight integration with the Prototype and Scriptaculous libraries. Prototype simplifies adding Ajax functions to a page, while Scriptaculous builds visual effects and other goodies on top of the Prototype framework. Rails provides a full suite of helper functions that leverage these libraries. Many of the helper functions are kissing cousins of the regular, html-generating helpers. This makes adding Ajax to a Rails project nearly transparent.

But wait, there's more good news. Ajax in Rails just got easier. The Rails 1.1 release represented a major upgrade. It

added features across the entire framework, including RJS templates—allowing us to group a set of dynamic changes, then launch them all as a single action. In this article, we will look at both the old-school Ajax helpers, as well as the new RJS features. However, before we jump into the wonderful world of Web 2.0, let's upgrade Rails.

On the surface, upgrading rails is stupidly simple. Just run the following command at the command line:

```
sudo gem install rails --include-dependencies
```

That's it? Well, not quite. That just updates the Rails library. Applications store several Ruby and JavaScript files locally. So, we need to update each application individually. Change to the application's root directory, then use rake to update it.

```
cd ~/rails_dev/HoneyDo  
rake rails:update
```

That's it then, right? Yes and no. Everything is upgraded—but upgrading is not always a good thing. For example Typo, a popular Rails blogging application, broke. Many people found their blogs in shambles after their web host upgraded to Rails 1.1. Even HoneyDo did not escape unscathed (we'll fix that in a minute).

Let this be a warning. Take extra care before upgrading any production system. If someone else hosts your application, you may have no control over when (or if) they upgrade their systems. But you can protect yourself.

The savior is rake, Rails own Swiss Army Knife. Rake started as a Ruby version of make (Ruby + make = rake, get it?). If you've ever complied a Unix application, you're probably familiar with the ubiquitous make. Rails, however, uses rake for much more than just builds. To see a full list of its features, execute the following (again, you must be in an application's root directory):

```
rake -tasks
```

The command we need is `rake rails:freeze:gems`. This makes a copy of the current Rails library and saves it in your application. Your application then runs off the local version. Your web host



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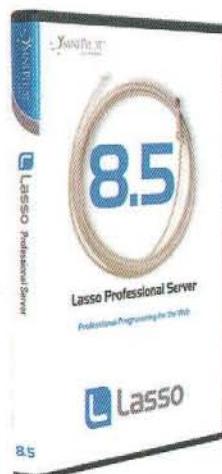
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## Upgrading Honeydo

Two things broke when we upgraded. Most importantly, the delete links no longer delete anything. Testing also produced a few odd errors (though the functions work fine when checked by hand). There might be something wrong with scaffold. Given the rapid rate of Rails development, the Rails crew will probably fix these problems before you can read this, but let's fix it by hand, just to keep us all on the same page.

Scaffolding creates seven default actions: :list, :show, :new, :create, :edit, and :destroy. You can override any of these by writing your own versions. In HoneyDo, we have overridden or replaced all the default actions except :show and :destroy.

Scaffolding comes in two flavors: dynamic scaffold and ScaffoldGenerator. Dynamic scaffold automatically creates these actions (and their associated views) behind the scenes. You won't find the :show or :destroy actions anywhere in the HoneyDo source code. ScaffoldGenerator, on the other hand, actually creates all the files and code needed by the default actions. You run a script, and it builds the necessary controllers and views. Be careful, however. ScaffoldGenerator will overwrite existing files.

To fix the upgrade errors, I made a copy of the entire HoneyDo tree, and then ran ScaffoldGenerator on that copy.

```
script/generate scaffold item item
```

ScaffoldGenerator created all the default actions and views. We just need to copy the :show and :destroy actions, as well as the show view. You also need to comment out the call to dynamic scaffold at the top of item\_controller.rb.

### **Listing 1: Item Controller**

app/controllers/item\_controller.rb

Add the following methods to the item controller. These methods replace the dynamic scaffold handlers for the :destroy and :show actions.

```
class ItemController < ApplicationController
  before_filter :login_required
  #scaffold :item
  layout 'template'

  def destroy
    Item.find(params[:id]).destroy
    redirect_to :action => 'list'
  end

  def show
    @item = Item.find(params[:id])
  end
```

### **Listing 2: Show View**

app/views/item/show.rhtml

Create the show.rhtml template. This replaces dynamic scaffold's show view.

```
<% for column in Item.content_columns %>
<p>  <b><%= column.human_name %></b> <%= h
```

```
@item.send(column.name) %>
</p>
<% end %>

<%= link_to 'Edit', :action => 'edit', :id => @item %> | 
<%= link_to 'Back', :action => 'list' %>
```

That's it. All the tests should run without any errors. Clearly (at least as I write this), dynamic scaffold and ScaffoldGenerator do not produce 100% compatible code. In the past, I preferred dynamic scaffolding, since it keeps the clutter to a minimum. However, ScaffoldGenerator is less opaque—and you can learn a lot by examining the code it generates.

ScaffoldGenerator also correctly escapes strings from the database. Dynamic scaffold still lets html tags go through (at least the ones I've tested). This could be a severe security risk. So, for now, I would recommend using ScaffoldGenerator to build any new applications.

## Ajax Rails Style

As I mentioned earlier, Rails includes several helper functions to create Ajax code. Let's take a quick look at the four general-purpose workhorses: link\_to\_remote(), form\_remote\_tag(), observe\_field() and periodically\_call\_remote(). There are others. Heck, we'll use some of them. But, let's get our toes wet first.

link\_to\_remote() creates a hypertext link. It takes two main parameters: a string and a hash of options. The string contains the link's text. The option hash generally contains both :update => 'itemID' and :url => { :action => :action\_name } entries. For the :update option, you provide the id of an existing tag (<div> tags are usually a safe bet). The :url option defines the source of the new html. Usually, this will be an action or a controller/action pair. When you click the link, Rails calls the named action, and then pours the resulting html into the listed tag. This replaces the tag's current contents; everything else on the page remains unchanged.

link\_to\_remote() can also take a second hash of html options. In most cases, you can safely ignore this.

There is one small gotcha. In our rails application, the html generated by each action is automatically wrapped in the default template. While this guarantees that every page has the same look and feel, we really don't want additional copies of the header and footer dropped into the middle of our page. To prevent this, add the following in the action's definition: render(:layout => false).

form\_remote\_tag() is even simpler. It replaces the form\_tag() helper. Again, you pass in a hash with :update and :url values. When you submit the form, it sends the contents of its fields to the :url's action. Again, the resulting html replaces the :update tag's contents.

periodically\_call\_remote() takes an additional option :frequency. This will automatically call the :url action every :frequency seconds, pouring the results into the :update tag.

Finally, observe\_field() is the most complicated. It takes a reference to a form's field and a frequency. Then, once

every :frequency seconds, it sends the value of the field to the selected action and performs the update.

### Listing 3: Ajax Sample

#### Sample Ajax View

The following example demonstrates calling the four basic Ajax helpers in a typical RHTML template.

```
<div id='test'></div>

<%= link_to_remote( 'Ajax Link', :update => 'test',
:url => { :action => :link }) %>

<%= form_remote_tag( :update => 'test', :url => { :action =>
:submit }) %>
<%= text_field_tag :mytext %>
<%= observe_field(:mytext, :frequency => 0.5,
:update => 'test', :url => { :action => :observe }) %>
<%= periodically_call_remote(:frequency => 10,
:update => 'test', :url => { :action => :periodic }) %>
<%= end_form_tag %>
```

And that just scratches the surface. We haven't even looked at effects yet.

### For Our First Trick...

If the helpers weren't enough, Rails has several special-purpose Ajax functions. For example, Rails can automatically create auto-complete text fields using `auto_complete_for()` and a little bit of spit and binding twine. We'll use this to replace our user drop-down list with an Ajax-powered text box.

The `auto_complete_for()` method takes a model object, an accessor method, and an optional hash. The hash contains parameters that `auto_complete_for()` then passes to the model's `find()` method. In our case, we will want the `:login` method for the `:user` model with no options. By default, `auto_complete_for()` returns the first ten records, sorted by the method's return value. That should work just fine.

```
auto_complete_for :user, :login
```

The `:new` and `:edit` actions no longer need a list of all users. Instead, we just want the current user. Since the forms are changing, `:save` and `:create` will need slight adjustments.

### Listing 4: Updated Item Controller

```
app/controllers/item_controller.rb
```

To enable the auto-complete text box, first call `auto_complete_for()`. Then make the following changes to the `new()`, `edit()`, `save()` and `create()` methods.

```
class ItemController < ApplicationController
  before_filter :login_required
  auto_complete_for :user, :login

  # scaffold :item
  layout 'template'

  def destroy
    Item.find(params[:id]).destroy
    redirect_to :action => 'list'
  end

  def show
    @item = Item.find(params[:id])
  end
```

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```

def list
  @user = @request.session[:user]
  @item_list = @user.todo_items
  @name = @user.login.capitalize
  @pages, @items = paginate(item, :order_by => 'priority
DESC, date',
                           :conditions => ['user_id = ?', @user.id])
end

def new
  @item = Item.new
  @user = @request.session[:user]
end

def edit
  @item = Item.find(@params['id'])
  @user = @request.session[:user]
end

def create
  user = @params['user']['login']
  sender = @request.session[:user]

  @item = Item.new(@params['item'])
  @item.sender = sender
  @item.user = User.find(:first, :conditions => ["login =
:name",
                                                 { :name => user}])
  @item.date = Time.now

  if @item.save
    flash[:notice] = "#{@item.title} successfully added
to" +
      " #{@item.user.login}'s ToDo list!"
    redirect_to :action => 'list'
  else
    @users = User.find(:all, :order => 'login')
    render_action 'new'
  end
end

def save
  user = @params['user']['login']
  item_hash = @params['item']

  @item = Item.find(item_hash['id'])
  # don't update the sender!
  @item.user = User.find(:first, :conditions => ["login =
:name",
                                                 { :name => user}])

  # don't update the time!

  if @item.update_attributes(item_hash)
    flash[:notice] = "#{@item.title} successfully
updated!"
    redirect_to :action => 'list'
  else
    @users = User.find(:all, :order => 'login')
    render_action 'edit'
  end
end

```

So far, so good. But, before the Ajax functions will work, we need to include all the Prototype and Scriptaculous JavaScript files (see <http://prototype.conio.net/> and <http://script.aculo.us/> websites for more information). Not surprisingly, Rails includes a helper function for this: `:javascript_include_tag :defaults`. Let's add this to the main template. That will provide the Ajax functions to all our views.

```

<%= stylesheet_link_tag 'scaffold' %>
<%= javascript_include_tag :defaults %>
<title><%= controller.action_name%></title>

```

In both the edit and new templates (`app/views/item/edit.rhtml` and `new.rhtml` respectively), look for the `collection_select()` helper. That currently creates the user drop-down menu.

```

<td><b>Send To User:</b></td>
<td>
  <%= collection_select(:item, :user_id, @users, :id,
:login)%>
</td>

```

Replace that with the `text_field_with_auto_complete()` helper as shown below. Just like `auto_complete_for()`, `text_field_with_auto_complete()` takes a model and a method. Typically, the method is an accessor or a virtual accessor. The function creates a list of every item in the model. It calls the accessor on each item, then compares the result with the text field's contents. If the text field's contents are a substring of the accessor's value, it is a match. `text_field_with_auto_complete()` returns the first ten matches. In our case, we will search through all the users and try to match their login.

```

<td><b>Send To User:</b></td>
<td>
  <%= text_field_with_auto_complete :user, :login %>
</td>

```

That's it. Start up MySQL and the WEBrick server, then point your browser at `localhost:3000`, login and try to add a new ToDo item. Your login should automatically appear in the "Send To User:" field. Try changing it, and play around with the auto-completion functions.

## Editing on the Same Page

Ajax is all about getting away from the click-on-a-link-move-to-a-new-page paradigm. As a gross oversimplification, this means doing everything on a single page. So, let's let users view and edit ToDo items directly on the list view.

In `item_controller.rb`, add `render(:layout => false)` if `request.xhr?` to the end of the `:edit` and `:show` actions. This keeps the action from dressing its html in the default template when the action is called by an Ajax request. However, it still functions properly if you access the action directly or connect using a standard link.

```

def show
  @item = Item.find(params[:id])
  render(:layout => false) if request.xhr?
end

```

Next, in the list view, add a second table.

```

<table width="50%" align="center">
  <tr><td><p><div id='scratchpad'></div></p></td></tr>
</table>

```

Only the `<div id='scratchpad'></div>` portion is important. Our Ajax functions will use it to display the `:show` and `:edit` html. The rest of the table is just rough formatting.

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In a real-world project, I would recommend using CSS to format the text instead, but for now let's keep things simple.

Next, we need to add the actual Ajax calls. Open the row partial. Change the `link_to()` helper to `link_to_remote()` for both the show and edit actions.

### Listing 5: Row Partial

`app/views/item/_row.rhtml`

The `link_to_remote()` helper function creates a link and the required Ajax JavaScript. Clicking on the link will call the `:show` or `:edit` action respectively. The returned html then replaces the contents of our scratchpad `<div>`.

```
<%= link_to_remote('Show',
  :update => 'scratchpad',
  :url => { :action => 'show', :id => row.id }) %> |
<%= link_to_remote('Edit',
  :update => 'scratchpad',
  :url => { :action => 'edit', :id => row.id }) %> |
```

That's it—more or less. Of course, we'll want to make a few tweaks to the edit and show templates. We'll also want to add a clear action, to clear the scratchpad. But it works as is. Try it out. Bask in the warm glow of Ajax.

Ok, too much basking. Let's add the clear action. Here we use the `link_to_function()` helper. As the name implies, this creates an html link which fires off a JavaScript function. In our case, we will use the `visual_effects()` helper to create a fade effect.

Edit both `show.rhtml` and `edit.rhtml`. In the show view, replace `link_to 'Edit'` and `link_to 'Back'`. In

edit, just append the code after the table.

```
<%= link_to_function 'close', visual_effect(:fade,
  'scratchpad') %>
```

Fade causes our scratchpad to fade out, eventually hiding it. To display new items in our scratchpad, we need to make it visible again. Let's add an `:appear` effect to the original `link_to_remote()` functions. Here the `:complete` option launches its JavaScript function once the action has finished.

### Listing 6: Rows With Effects

`app/views/item/_row.rhtml`

The `:complete` option launches the `:appear` effect once the `:show` or `:edit` action completes.

```
<%= link_to_remote('Show',
  :update => 'scratchpad',
  :url => { :action => 'show', :id => row.id },
  :complete => visual_effect(:appear, 'scratchpad')) %> |
<%= link_to_remote('Edit',
  :update => 'scratchpad',
  :url => { :action => 'edit', :id => row.id },
  :complete => visual_effect(:appear, 'scratchpad')) %> |
```

As you can see, you can pass the Ajax helper functions a wide range of options, allowing you to tweak their behavior. I recommend browsing through the Rails documentation. Specifically, look at `ActionView::Helpers::JavaScriptHelper`, `ActionView::Helpers::PrototypeHelper` and `ActionView::Helpers::ScriptaculousHelper`.

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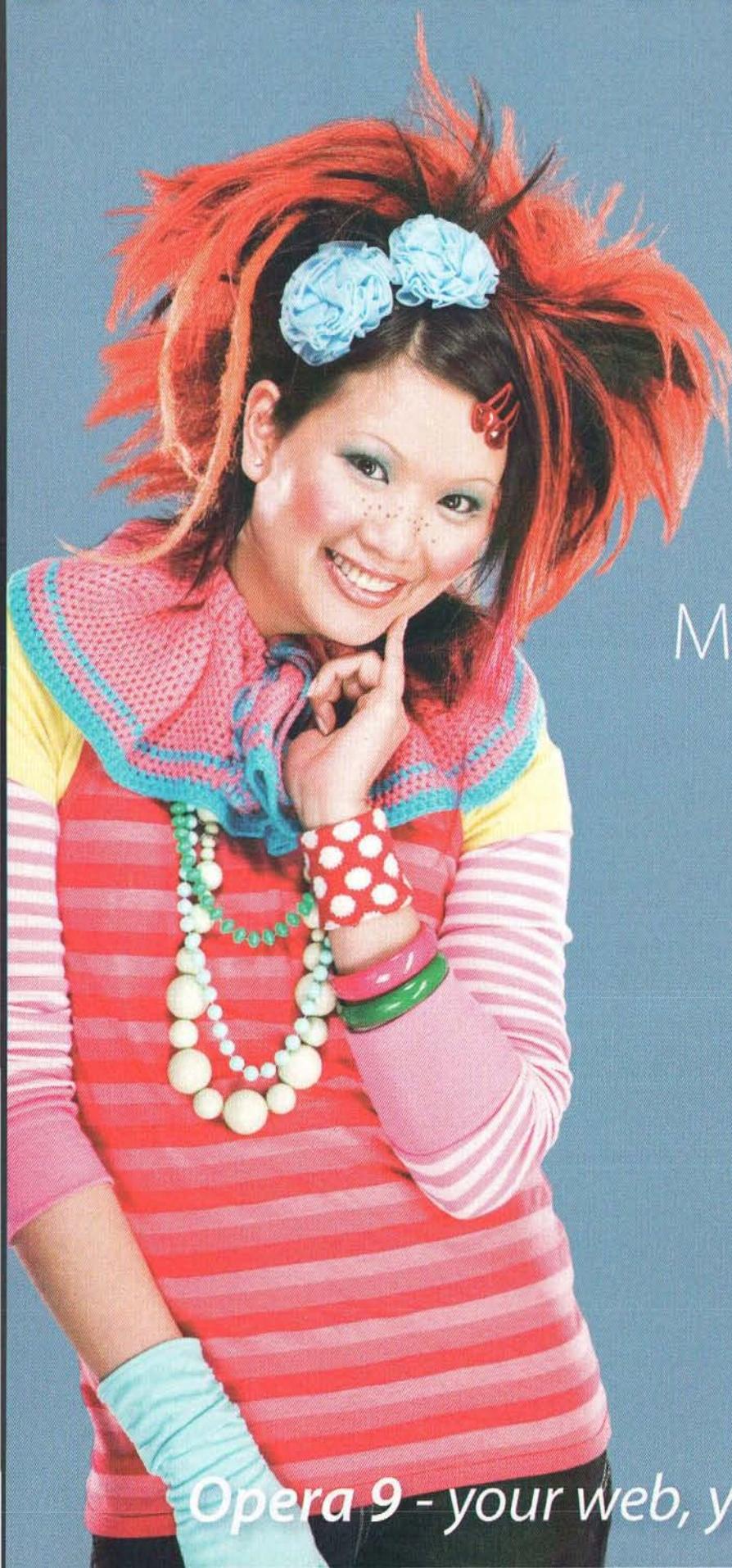
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One last, little tweak. Back in `list.rhtml`, we want the scratchpad to start hidden, otherwise, the initial :appear effect will not work.

```
<div id='scratchpad' style='display:none'></div>
```

That's it. Take the new interface for a spin. I'd also suggest taking a moment to stretch. Maybe get a cup of coffee. We've plucked all the low-hanging fruit. The next step is a little more challenging.

## The Next Step

As you can see, you can accomplish a lot with the built-in Ajax functions. The Rails helpers are particularly effective when each action changes just one part of the page. But, what if you want to make several changes at once? Enter RJS templates.

RJS templates (or more precisely JavaScriptGenerator templates) are a new addition with Rails 1.1. As you might guess, RJS templates are views that end with `.rjs`. Unlike RHTML (and RXML), RJS does not provide instructions for rendering a new page. Instead, these templates contain a list of Ajax commands that alter the currently rendered page.

When an Ajax helper fires off an action, the action automatically calls the associated RJS template. The template provides access to a JavaScriptGenerator object named `page`. You can use `page` to insert or remove html; to replace, show or hide page elements; or to create visual effects. Check out the documentation for `ActionView::Helpers::PrototypeHelper::JavaScriptGenerator::GeneratorMethods` for more information.

OK, let's put all this to use. Currently, when we edit a page we're redisplaying the entire page. Instead, we would like to update only those parts that actually change. That, however, opens a real can of worms—how many changes are possible? It seems simple. Obviously, the application needs to update the row we just edited. We also want a flash message saying the item has changed. But it's a little more complicated than that. Items are sorted by their priority. If we change the priority, then we need to reorder the rows. If you have more than ten items in your ToDo list, then the edited item could shift to a different page. We could try to determine exactly which tags need changed, then update them with surgical precision—but that would be difficult, probably bug prone, and possibly computationally expensive. Instead, let's replace the entire table.

First, we need to move the table into its own partial. In `list.rhtml`, copy the upper table, and place it in its own file, `_table.rhtml`.

### **Listing 7: Table Partial**

`app/views/item/_table.rhtml`

Move the following code from `list.rhtml` to `_table.rhtml`. Moving the table-generation code to its own partial lets us regenerate the table on demand.

```
<table border="1" cellspacing="0px" cellpadding="5px"
      align="center" id="todo">
  <tr bgcolor="#cc9966">
    <th>Item</th>
    <th>Priority</th>
    <th>Date</th>
    <th>Sender</th>
    <th>Description</th>
    <th></th>
  </tr>
  <%= render :partial => 'row', :collection => items %>
</table>
```

Within the list view, replace the table with the following code:

```
<%= render :partial => 'table', :locals => {:items =>
  @items} %>
```

So far, we haven't really changed anything. The page should still look and function the same as before. However, moving the table to its own partial, lets us update the table whenever we want.

Next, in the main template add a `<div>` tag around the flash notice as shown. This allows us to change the flash text. We could try to update the `<p>` tag directly; however, the application only creates that tag when there is a `flash[:notice]` message. You can't change something that doesn't exist. Creating a separate `<div>` guarantees we have a valid target.

```
<div id='flash'><%=
  "<p style='color: green'>#{@flash[:notice]}</p>">
  if @flash[:notice]
  %></div>
```

Normally an Ajax helper will look for a `.RJS` file whose name matches the action. Logically, we should then create a file named `save.rjs` that contains the code shown in listing 8.

### **Listing 8: Sample RJS Code**

`Sample app/views/item/save.rjs`

Under normal circumstances, Rails would call the following code automatically whenever an Ajax function called the corresponding `:save` action.

```
page[:scratchpad].hide
page.replace 'todo', :partial => 'table', :locals =>
  {:items => items}
page["row#{@item.id}"].visual_effect :highlight,
  :startcolor => '#00ff00', :duration => 5

page.replace_html 'flash',
  "<p style='color:green'>#{@item.title} successfully
  updated!</p>"
page[:flash].show
page[:flash].visual_effect :pulsate, :queue =>
  {:position => 'end',
   :scope => 'flash'}
page[:flash].visual_effect :fade, :queue => {:position
  => 'end',
   :scope => 'flash'}
```

Unfortunately, this doesn't work. Our application adds the edit form to the page dynamically. The form was not part of the original page. I suspect this confuses `_edit.rhtm`'s Ajax helpers. However, there is a way around

this problem. We can move the code into the controller itself. I don't like this. It mixes display code with controller code. But, you gotta do what you gotta do.

Open up `item_controller.rb`, and change the `:save` action. Listing 9 also includes code to catch saving errors.

### Listing 9: Corrected Save Action

`app/controllers/item_controller.rb`

Our `:save` action does not correctly call the `save.rjs` template. Instead, move the Ajax changes into the item controller. The controller creates a `JavaScriptGenerator` object. We then use that object to create a series of dynamic changes to the current page.

```
def save
  user = @params['user']['login']
  item_hash = @params['item']

  @item = Item.find(item_hash['id'])

  # don't update the sender!
  @item.user = User.find(:first, :conditions => ["login
= :name",
  { :name => user}])
  # don't update the time!

  if @item.update_attributes(item_hash)
    user_model = @request.session[:user]
    item_list = user_model.todo_items
    pages, items = paginate(:item, :order_by =>
'priority DESC',
    :date, :conditions => ['user_id = ?',
    user_model.id])

    render :update do |page|
      page[:scratchpad].hide
      page.replace 'todo', :partial => 'table', :locals =>
        { :items => items}
      page["row#{@item.id}"].visual_effect :highlight,
        :startcolor => '#00ff00', :duration => 5

      page.replace_html 'flash',
        '<p style="color:green">#{@item.title}
successfully updated!</p>'

      page[:flash].show
      page[:flash].visual_effect :pulsate, :queue =>
        { :position => 'end', :scope => 'flash'}
      page[:flash].visual_effect :fade, :queue =>
        { :position => 'end', :scope => 'flash'}
    end
  else
    @user = @request.session[:user]
    render :update do |page|
      page.replace_html 'scratchpad', :partial =>
'edit'
      page[:ErrorExplanation].visual_effect :pulsate,
      :duration => 3
    end
  end
end
```

Good enough, but what does the code do? Well, `render :update` creates a `JavaScriptGenerator` for the current page, and passes it a block. Within the block, we use the `page` object to make our changes. You access elements using their id: `page['id']` or `page[:id]`.

If the `save` is successful, we hide the scratchpad, then replace the table with new data generated by the table partial. Next, we highlight the changed row. Specifically we change

the background color to green and then have it fade back to its normal color over 5 seconds.

For the flash message, we replace the contents of the flash `<div>` with the success message. We then show the message, cause it to pulse, and then make it to fade away. There are two important things to note here. First, look at the difference between `page.replace` and `page.replace_html`. `page.replace` replaces the named tag, while `page.replace_html` only replaces the tag's contents. When we replace the flash `<div>`, the `<div>` remains (allowing us to send it more messages later).

Next, look at the flash message's visual effects. Normally, visual effects run in parallel—which often means the last effect overrides the others. Here, we are creating a named queue, and adding the events to the end of the queue. Effects in a queue run sequentially. This means the pulsate effect will run. When it finishes, the fade effect runs.

One last detail, the current code always replaces the table with the first page. This is fine when you have less than ten items, or if you only work on the first page. Otherwise, we need to track the current page.

We want to access the page number in different actions, so let's save it in the session. Add the following to the end of `item_controller`'s `list()`:

```
session[:page] = @pages.current.number
```

Now, we need to recover this value in `edit()`. Again, add the following code:

```
@page = session[:page]
```

`@page` is an instance variable, and Rails passes all the controller's instance variables to its views. So, within the `_edit.rhtml` partial, we can access the `@page` variable as shown:

```
<%= form_remote_tag :url => { :action => 'save', :page => "#{@page}" } %>
```

This inserts the page number into the parameters that we then pass to the `:save` action. Inside `save()`, the `paginate()` function automatically picks up the page number, and produces the correct page. Everything else works auto-magically.

OK, try it out. Edit an item, and watch the changes. I know, I know. The effects are a bit much. But, I hope you can see the possibilities.

Up next, adding and deleting ToDo items. I leave those as homework problems. You should be able to follow the edit example above. However, pay attention to `:destroy`. It has additional complications. What happens if you delete the only item on a page?

## Cleaning Up The Code

I recommend subscribing to the RSS feed for the Ruby On Rails blog (<http://weblog.rubyonrails.org/>). A lot of good

information flows through here. Recently, an article pointed out that the code used by many Rails tutorials and books (including my last article) has been deprecated. Specifically, you should no longer access the `@params` variable directly. Instead, access the parameters through the `params()` method (just delete the `@`). This is generally good programming advice—use the accessor method to access the data. This allows you to change how and where the data is stored without breaking the application. The same rule applies to `@request`, `@response`, `@session`, `@headers`, `@template`, `@cookies`, and `@flash`. In addition, `@content_for_layout` should be replaced with a simple `yield()` call.

I will not go through all these changes here. But, I have tried to clean up the sample code. Please forgive me if I've missed the occasional variable.

Changing from standard actions to Ajax helpers causes some of our test cases to fail. Again, testing is beyond the scope of this article; however, I have updated all the tests in the sample code. I have also added sample integration tests (also new with Rails 1.1). Check out the sample code for more information.

## Ajax Dark Side

Ajax is impressive, but it has a few problems. First, it uses CSS and JavaScript heavily—both are famous for producing different behavior on different browsers. Older browsers, in particular, may choke on all the Ajax code. The Prototype and Scriptaculous libraries try to isolate you from many of these ugly, cross-platform details, but compatibility problems will occasionally raise their pointy little heads. If you're building a production system, test on as many different browsers as possible. Also, you might want to define a fallback command for non-JavaScript browsers using `form_remote_tag`'s `:html` option or `link_to_remote()`'s `:href` html option. See the Rails API for more information.

The second problem is a little subtler, and deserves a lot more thought. After you Ajaxify your web page, the back button may not work as expected. The back button takes you back to the previous page. It does not undo any changes made to the current page.

Sometimes a functioning back button is more important than cool Ajax effects. Think about the application's workflow. Often, you can split an application into logical groups. Use standard links to move between groups (enabling the back button), but Ajax techniques within a group.

Finally, Ajax often complicates testing. This is particularly true if you are testing the html itself. The Rails testing suite has a number of tools to pull apart html tags and verify the presence (or absence) of specific tags. Unfortunately, most Ajax functions return html embedded in JavaScript. The tags are apparently no longer accessible. However, this might be for the best. HTML-level testing is very fragile. It often breaks when you change the layout. Your time is probably better spent creating more-robust test cases. For example, integration tests can handle Ajax functions just fine.

## Conclusion

Rails takes much of the pain and general ugliness out of writing Ajax applications. Ajax adds a layer of complexity to your application—but Rails effectively manages this complexity, making it almost transparent. So, try it. You might like it.



## About The Author

**Rich Warren** lives in Honolulu, Hawaii with his wife Mika and daughter Haruko. He is a freelance writer, programmer, and part-time Graduate student at the University of Hawaii in Manoa. When not playing on the beach with his daughter, he can be found writing, studying, doing research or building web applications—all on his MacBook Pro. You can reach Rich at <[rikiwarren@mac.com](mailto:rikiwarren@mac.com)>.

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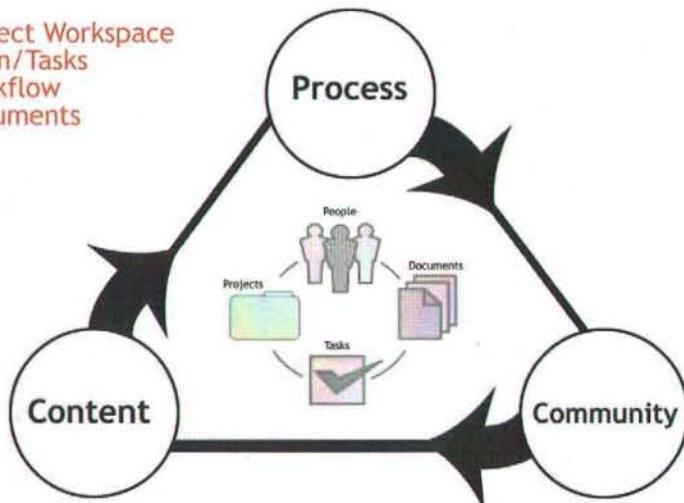
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- Profile & Personal Blogs



## Features

NetTeam Server's fundamental constructs are People, Projects, Tasks and Documents.

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User roles determine access privileges and which (if any) tools are presented on login. Blogs are used extensively to support publishing, information and knowledge management. Wikis will be available in a late-summer update.

The screenshot shows the NetTeam Server interface. At the top, there's a navigation bar with links for Home, Log In, and Help. Below it is a sidebar with a profile picture of Paul Smith and a search bar. The main content area is divided into several sections:

- Tools:** Includes links for Contacts, Library, Projects, Web Content, and Blogs.
- Projects / Tasks:** A grid view showing tasks for May 2008. One task is highlighted: "Project Launch" due on May 19, 2008.
- News:** A news item about the CEO's launch.
- Blogs:** A blog entry from the CEO.

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# Kool Tools

## miniStack

- By Jordan Ticktin

Mac mini's use 2.5" hard drives, so they are limited on the capacity (160GB as of this writing). But, the mini is capable of so much more. So how do you get the mini more storage? Simple. You add an exterior hard drive. One example is Newer Technology's miniStack.

### What It Is

Newer Technology's miniStack is a hard drive solution for your Mac mini, but it also gives you the ability to act as a USB and FireWire hub. It has 3 USB ports, 3 FireWire ports, a USB uplink port, 2 different types of connections to the Mac mini, and a security slot to secure the miniStack to your desk with a Kensington MicroSaver Security Cable.



**Figure 1: The miniStack V2 with all of its slots showing.**

The miniStack takes up virtually no space because it fits seamlessly together with (under) your Mac mini.



**Figure 2: Newer Technology's miniStack (with Mac mini on top)**

The power management system is designed to work with your mini, and conserve power. When the miniStack's switch is set to on, it will turn on and off whenever your Mac mini does.

There are two different ways to connect a miniStack to a Mac mini: via USB and via FireWire. The miniStack gives you a couple of choices to optimize for your scenario.

1. You flip the connection switch to auto in which case you will connect with either USB or 1394 (FireWire) to the Mac mini ... automatically choosing as appropriate;
2. Or, you flip the switch to 1394a and you connect the miniStack to the Mac mini though **only** FireWire, which will make it run faster.

The miniStack reviewed is the second generation design. In version 2, you no longer have an option to manually set the fan speeds; the miniStack automatically controls the fan to keep the

unit cool. It also has a large passive heat sink to radiate heat away from the hard drive.

To give you more flexibility in your setup, one of the USB ports and one of the FireWire ports are now on the left side instead of the back. Newer Technology touts the miniStack as 34% faster than the mini's internal hard drive.

Depending on what you want, there are a couple of ways that you can purchase this product from Newer Technology:

1. If you want it without a hard drive (no software included): \$79.95

2. If you want it with a hard drive in it (EMC Retrospect Backup and Intech HD Speedtools included):

80GB \$119.00 - 160GB \$139.00

250GB \$159.00 - 320GB \$189.00

400GB \$269.99 - 500GB \$295.99

750GB \$499.99

This product has a two year repair/replacement warranty.

### What We Thought

To put this product to the test, we thought we'd try it as a small file server ... that is a physically small server that has three quarters of a terabyte of disk space. After running it for several weeks under Mac OS X Server, we were quite satisfied with the results.

Obviously, a Mac mini is not a high throughput machine, nor is an external FireWire drive as efficient as an internal drive, but that's no fault of the miniStack. If you need a physically small file server, that's relatively quick, can have a good amount of disk space, and doesn't need high throughput, a mini combined with a miniStack is a great solution. (Although remember, the mini's 2.5" internal drive is not intended for server use ... so make sure you back up your boot drive.)

Or, if you just want a ton of disk space for your mini, this is simply a great solution ... not just because it's elegant, but because of all the additional ports it has as well.

For more information on Newer Technology's miniStack, visit <<http://www.newertech.com/ministack>>.



## CompuRover AW Bag

- By MacTech Review Staff

For any serious photographer, functionality is the key to finding a great bag. But what happens if you are both a serious photographer, and a heavy laptop user ... as many of us are. Carrying a SLR setup along with a laptop is a bag challenge if you are on the go, particularly if you are looking for a backpack.

The CompuRover AW backpack from Lowepro is a great quality pack that allows you to carry relatively heavy equipment. This three-compartment backpack is designed to



carry a digital pro SLR with lens attached, 2-4 additional lenses, a 17" notebook computer, digital accessories, and any additional personal items. Better still, because the backpack has a waist belt, the weight sits on your hips, not on your shoulders. Carrying 30 pounds of camera and computer

equipment is not an issue, as we did recently to test the bag.

Although the placement of the camera pocket is at the bottom of the bag, there is enough padding to protect the camera lens if it is facing downwards. While initially the camera section seemed to be in a funky position, it became clear quickly in use that this was designed for quicker access ... with the option of zipping, buckling, or both to close the case. In addition, there's a built-in trekker tripod mount for attaching tripods up to 10 lbs.

If you spend hours hiking or walking with your equipment, as we did in testing this bag, then comfort is paramount. We found the waist belt is very comfortable, even under weight. In fact, the more weight, the better the bag felt. The shoulder straps are well padded. And, of particular comfort was the extra padding between your back and where the laptop goes. The only thing that we wished for was to be able to pull some of the adjustment straps at the top of the shoulder straps even tighter, but this is a minor nit.

There's no doubt that the CompuRover AW is well built, sturdy, and even water-resistant. One of the coolest things that we found was it's built in all weather cover which acts like a "poncho" for your back pack, securing it with a elastic band around the edge. Better yet, the bag was particularly easy to take on and off, even fully loaded.

In case you are wondering where the laptop goes, there's a side-access laptop pocket that we slid a 17" PowerBook into. Being flat against your back, it was very comfortable, not to mention fast to access at airport security checks.

The backpack's top pocket is smaller than expected for such a big bag, but that's the price you pay for all that padding around the camera and laptop pockets. The price (US\$229.99) and slightly excessive weight of the bag are drawbacks, but well worth it when you realize that you are protecting several thousands of dollars in equipment. In fact, the padding was so good that when we were caught in the recent upgraded airport security, we felt comfortable *checking* the bag as luggage (although we don't recommend this).

If you are not going to mostly fill this bag, then it's overkill, and you'd be better off with a different option. But, if you need to carry a laptop and SLR setup, then you need a way to carry that weight, and this bag is a great solution. More information available from <<http://www.lowepro.com>>

## PDF Shrink 4.0

- By MacTech Review Staff

Working here at MacTech Magazine, in a production environment that deals with massive image files, and emailing each other PDF files for review can be a bit daunting. We needed something that could quickly compress a PDF that did not include having to use a utility to compress it so that it would be immediately viewable in email clients. Yet, we wanted something that would preserve the PDF format. This is when we found PDF Shrink from Apago Inc.

### What is it?

PDF Shrink boasts as much as a 90% size reduction of most PDF files, but it all depends on what is in the file, and the options for compression. Apago posts actual results of compression when creating PDFs from a variety of different applications. Of course, your mileage may vary.

PDF Shrink 4.0 includes optional encryption of PDF content, support for JPEG 2000 image compression, and a wizard for creating customized settings, if technical terms like compression codec and "dots per inch" make you squirm and scratch your head in frustration.

Since images make up a rather significant part of the size of a PDF file, this software can modify the resolution and compression level of the images to match different requirements. Fonts also unnecessarily increase PDF file size, so PDF Shrink 4.0 has been designed with an option that allows you to remove embedded base 14 fonts, if required. Another cool option in PDF Shrink, is being able to delete unused elements such as metadata, thumbnails, and duplicated data.

A new encryption feature in PDF Shrink 4.0 protects your documents. Select from several options, such as whether to allow changes and printing and content extraction to restrict use or add a password to prevent unauthorized access. All you have to do is tell the Shrink 4.0 how you intend on using your PDF, and it selects the appropriate settings for you. There is also an Advanced mode for directly specifying your settings.

To use PDF Shrink, you can choose from a number of different settings. Either drag-and-drop a PDF to the application icon or dock, or drag-and-drop to a setting. You can also print through PDF services, create a droplet, or use AppleScript.

### What we think

One of the things we like best about PDF Shrink is it's speed and easy to use interface. Being able to just drag and drop a PDF file onto your favorite setting is incredibly easy and time saving.

If we could change anything, it would be to have more options for image compression, but there are other tools, including ones from Apago that serve this well. This is a very useful product and well worth the price for most people's use.

PDF Shrink 4.0 retails at US \$35. Upgrades from earlier versions of PDF Shrink for current users available for US\$14. Visit <<http://www.apago.com/upgrade/>> to purchase upgrade. However, if you bought PDF Shrink after May 1, 2006, the upgrade is free.



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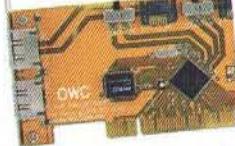
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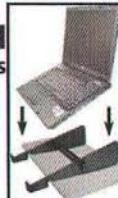
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